The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

	PAGE
EDITORIAL NOTES: Expanding Overseas Chemical Trade; The Training of Chemical Engineers; European Benzole Conferences; New Sulphate Prices	561
Chemical Exhibits at the British Industries Fair	563
Overseas Chemical Trade for November	564
Correspondence: What of the Wochenals?; A Science Party	565
Institution of Chemical Engineers Associateship Examination	566
The Dyestuffs Patent Action	568
Colour Testing and Fastness to Light: Papers before the Oil and Colour Chemists	570
Zinc Oxide Manufacturer's Action	571
From Week to Week	573
References to Current Literature	574
Patent Literature	575
Weekly Chemical Prices and Market Reports	578
Company News	582
Commercial Intelligence; New Companies Registered	584

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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CHRISTMAS HOLIDAYS.

The offices of THE CHEMICAL AGE *will be closed on Wednesday and Thursday, December 25 and 26.*

Expanding Overseas Chemical Trade

THE year is closing with the most encouraging news that the November chemical trade returns are the best of the year. The slight set-back experienced in the middle months of 1929 has been more than balanced by the recent recovery, and it is clear that on the whole year a substantial advance in overseas trade will be registered. The figures for November alone are particularly good. Compared with the corresponding figures for 1928, there has been a decline in chemical imports of £117,216, while the chemical exports have increased by £266,107, the total exports of chemicals, drugs, dyes and colours for the month amounting to the impressive figure of £2,560,495. For the eleven months of the year the returns show a general increase in the volume of trade. Though imports have increased more than exports (the increase being £1,282,834), the balance of chemical exports over chemical imports is still substantial, being £24,048,006 to £15,374,814. In this respect the chemical trade comes out extremely well, in comparison with other industries, or with the national trade totals as a whole.

In the detailed figures there are, as usual, a few points worth noting. On the imports side the imports of acetic acid have gone up from £41,485 to £102,817, of borax from £3,123 to £14,918, of distilled glycerine from £378 to £3,034, and of calcium carbide from £42,395 to £67,593. On the other hand, imports of coal tar products have fallen from £27,438 to £9,002, and miscellaneous items from £545,904 to £349,884. Dyestuff imports are up from £1,221 to £1,940, but there are declines in cutch and other extracts for dyeing and tanning, and in painters' colours. The increase in chemical exports is largely accounted for by the enormous and sustained expansion of sulphate of ammonia exports, the principal markets being Spain and the Canaries, Japan, and unspecified "other countries." The last item, by the way, is becoming an important figure in the returns. Coal tar products are down seriously, the principal decline being in tar and creosote oils (£167,229 to £52,519). The export trade in disinfectants is better; glycerine exports (both crude and distilled) have advanced from £22,663 to £59,672; while potassium compounds are down, sodium compounds have increased over £50,000; dyestuffs have fallen about £15,000, but painters' colours have improved upon the strong figures of last year. The re-export trade in chemicals continues to show a decline.

The Training of Chemical Engineers

THE Institution of Chemical Engineers has just issued for publication the papers set at the last examination for the Associate Membership. A study of the questions shows that the Institution is determined to maintain a high standard of knowledge, and there can be no doubt that this is entirely for the good of the profession. The report of the examiners indicates that the answers to the papers showed that the questions were on the whole better answered than in previous years—which is a clear proof of the point made above.

The candidates, say the examiners, have apparently realised the necessity of being able to solve mathematical problems. A compulsory question dealing with materials used in the construction of chemical plant was, however, not well answered, most of the candidates showing a great lack of knowledge on the subject. On the whole, the answers to the drawing paper were distinctly above those of last year, although in some cases the candidates showed only an elementary knowledge of this subject. The impression gained from this examination is that the requirements of the Institution in its examination for admission to Associate-Membership are gradually becoming recognised.

This seems an appropriate time at which to refer to the publication of the professional journals dealing with chemical engineering in this country. These are the *Transactions of the Institution of Chemical Engineers*

and the *Proceedings of the Chemical Engineering Group*. Of the *Transactions*, Volume 6 (1928) has just appeared. It contains the following contributions, presented at various meetings:—"The Economics of Power as Applied to Chemical Engineering" (presidential address); "The Theory of Magnetic Separation"; "The Combustion of Powdered Coal—The Influence of the Degree of Fineness of the Particles"; "The Treatment of Beet Sugar Effluents"; "Fluid Jets and Their Industrial Application"; "Making Rubber Goods by Electro-Deposition"; "The Seasoning or Drying of Timber"; "Tunnel and Stove Drying"; "Film and Spray Drying"; "Drying by Pressure"; "Rotary Dryers"; "Vacuum Dryers"; "The Hygroscopic Nature of Textile Fabrics"; "The Drying of Agricultural Products"; and "Some Drying Problems of Tropical Africa." The Chemical Engineering Group of the Society of Chemical Industry has published Volume 10 of its *Proceedings* (price 10s. 6d.), comprising the following papers:—"The Manufacture of Artificial Silk; with special reference to Viscose"; "Dry Cleaning Machinery, with some notes on a New Laundry Process"; "The Art of Soap Manufacture"; "Ultra-Violet Radiation in Industry"; "The Heat Treatment of Ferrous Metals"; "The Control of Reactions in Organic Syntheses"; "Road Surfacing Materials"; "Factory Floors"; "Glycerin and its Substitutes in Industry"; and "The Air Lift as a Chemical Engineering Appliance." The two lists are impressive in the ground they cover, and testify to the fact that the profession of chemical engineering in this country is in a healthy and energetic condition.

New Sulphate Prices

THE new prices for sulphate of ammonia for the first six months of 1930, just announced by Nitram, Ltd., show a slight upward tendency. For January the price is fixed at £10 per ton for neutral quality guaranteed to contain 20-60 per cent. of nitrogen by weight and not to contain more than 0·025 per cent. of free acid (H_2SO_4) and to be in friable condition. For the five months February–June, the price will be advanced to £10 2s. In fixing these prices, the shilling per ton rebate on railway carriage, which was allowed during a part of last season to give buyers the benefit of the Derating Act, has been taken into account, so that in future no rebate or allowance of this nature will be made. These prices, of course, are for home agricultural purposes only, and contracts are subject to a stringent clause prohibiting export or sale for export. As practically no sulphate of "ordinary" quality is likely to be available, no price quotations are given for this quality.

European Benzole Conferences

REPORTS have recently appeared of a meeting of the European producers of benzole in Paris, and it is now announced officially that a meeting of a small committee of the International Conference of Benzole Producers was held at Bochum, Westphalia, on Thursday, December 12. The present conditions of the market were reviewed, and the meeting was followed by a visit to the research laboratories of the German Benzol Verband. It is stated that undue significance has been attached in some quarters to the aims and objects of the First International Conference of Benzole Producers held in Paris. It was never the intention to form an international combination. The meetings have for their object the periodical exchange of views with regard to the best method to be employed in marketing and encouraging the use of benzole as a motor fuel in all countries, and the standardisation of benzole specifications. Both British and German benzole producers already have their separate organisations for marketing benzole, which is sold mainly in the form of a blended mixture. The marketing organisation in this country, which is owned and controlled entirely by the producers of British benzole, is the National Benzole Co., Ltd., and the form in which British benzole is sold is as an admixture branded as National benzole mixture. The use of benzole as a motor fuel is becoming increasingly popular in both England and Germany.

Books Received

DEFINITIONS AND FORMULAE FOR STUDENTS. CHEMISTRY. By W. Gordon Carey. London: Sir Isaac Pitman and Sons, Ltd. Pp. 24. 6d.

CHEMICAL ENGINEERING GROUP PROCEEDINGS. Vol. X. 1928. London: Chemical Engineering Group. Pp. 132. 10s. 6d.

FILTRATION AND FILTERS. By J. A. Pickard. London: Ernest Benn, Ltd. Pp. 488. 45s.

WATER SOFTENING: THE BASE-EXCHANGE OR ZEOLITE PROCESS. Department of Scientific and Industrial Research. Water Pollution Research. Technical Paper No. 1. Pp. 20. 6d.

THE SOUTH AMERICAN HANDBOOK, 1930. London: Trade and Travel Publications, Ltd. Pp. 746. 2s. 6d.

COAL CARBONISATION. By R. Wigginton. London: Bailliére, Tindall and Cox. Pp. 287. 21s.

MODERN METHODS OF COCOA AND CHOCOLATE MANUFACTURE. By H. W. Bywaters. London: J. and A. Churchill. Pp. 316. 21s.

APPLIED INORGANIC ANALYSIS. By Dr. W. F. Hillebrand and Dr. G. E. F. Lundell. London: Chapman and Hall, Ltd. Pp. 930. 42s. 6d.

ORGANISCH-CHEMISCHES PRAKTIKUM. By Dr. L. Orthner and Dr. L. Reichel. Berlin: Verlag Chemie. Pp. 260. Mk. 10.

STANDARD METHODS FOR TESTING TAR AND ITS PRODUCTS. London: Standardisation of Tar Products Test Committee. Pp. 296. 7s. 6d.

UBBELOHDE'S HANDBUCH DER CHEMIE UND TECHNOLOGIE DER OLE UND FETTE. Edited by Dr. Hans Heller. Leipzig: S. Hirzel. Pp. 752. M.75.

REMINDERS FOR COMPANY SECRETARIES. By Herbert W. Jordan. London: Jordan and Sons, Ltd. Pp. 66. 2s. 6d.

The Calendar

Jan. 6	Society of Chemical Industry (London Section): "The Micelle Chemistry of Cellulose." C. J. J. Fox. "Meta-filtration." J. A. Pickard. 8 p.m.	Burlington House, Piccadilly, London.
8	Institute of Fuel: "Fuel Economisers with special reference to their Construction, Materials and Recent Developments." O. Kubalek.	Burlington House, Piccadilly, London.
9	Institute of Metals (London Section): "The Aluminium Industry." G. Mortimer. 7.30 p.m.	83, Pall Mall, London.
9	Society of Chemical Industry (Bristol Section): "Wood Distillation." F. G. Conyers. 7.30 p.m.	University, Bristol.
9	Institute of Chemistry (Manchester Section): "The Medical Witness." Dr. R. M. Brontë.	Manchester.
10	Chemical Engineering Group: "Autogenous Welding in Chemical Works." J. R. Booer. 8 p.m.	Burlington House, London.
10	Oil and Colour Chemists' Association (Manchester Section): "Recent Research on Fats bearing upon the Drying of Oils in Paint and Varnish." Professor T. P. Hilditch. 7 p.m.	Milton Hall, Deansgate, Manchester.

Chemical Exhibits at the British Industries Fair

Preliminary Notes on the Sections

THE close connection of chemistry with the necessities and luxuries of modern life and the steady progress which the British Chemical Industry is making, on both scientific and utilitarian lines, will be demonstrated in the British Industries Fair, Olympia, London, from February 17 to 28, when the exhibit held under the auspices of the Association of British Chemical Manufacturers will be on the ground floor in the annexe of the Main Hall. The exhibit will cover all branches of the industry, including heavy chemicals, fertilisers, explosives, coal tar derivatives, fine chemicals of all kinds, medicinal, pharmaceutical, photographic and analytical, perfumery chemicals, solvents and dyestuffs.

"The general impression in every branch," the organisers state, "will be found to be improved quality at reduced prices, together with a rapidly growing list of new products. It will be demonstrated that the British chemical industry, working along logical and scientific lines, is well in the forefront of the latest developments. Anyone seriously interested in the commercial applications of chemicals will find a visit to the Fair well worth while. The Association will have an office at Olympia for the period of the Fair, where inquiries may be made and the Association's six-language directory consulted. The British Chemical Plant Manufacturers' Association will also have an office in the section, where members' catalogues may be referred to and appointments with members arranged."

Heavy Chemicals and Fertilisers

Even in this field, where the British products have a world-wide reputation, advances will be shown. The common acids and alkalies will be available in the now familiar form of special strengths and qualities exactly suited to every special purpose, the industries catered for including soap, glass, paper, artificial silk, iron and steel, galvanising, etc. Bleaching materials are included in this section for makers of textiles, soap, sugar, glue, while a feature of interest is the progress made in special brands and packages for tropical conditions.

Among fertilisers, perhaps the most interesting innovation will be found in the fact that steps are now being taken to try out on a practical scale those artificial manures which are gradually becoming such an important alternative to natural materials.

Coal and Coal Tar Products

The products recovered from coal are now well know even to the general public, including as they do fertilisers, motor fuel, disinfectants, and the raw materials for dyestuffs, explosives, and insecticides. Considerable interest attaches to recent improvements in road tar and tar-bitumen compounds of absolutely reliable standard, and tar emulsions for cold application, and the arrangements which can be offered in the matter of deliveries and for spraying from modern road tanks. Mention must be made of the new uses which are being found for creosote and its application to wood.

Medicinal and Pharmaceutical Chemicals

The fine chemical industry will be especially well represented and will demonstrate the remarkable contribution to the re-establishment of British trade which, it is claimed, it has been enabled to make under the encouragement of the Safeguarding of Industries Act. Great interest attaches to the latest products for medical and therapeutic use, made under carefully controlled conditions and close Government supervision. Two recent compounds of interest have given excellent results in the treatment of colds and influenza, and in the fight against maternal mortality. The usual pharmaceutical products such as anæsthetics, antiseptics, alkaloids, drugs, gland extracts and vitamin substances, will be shown in all kinds of packages ready for every kind of treatment in any part of the world. The new arsenic preparations used in the treatment of tropical diseases, sleepy sickness and dysentery will also be shown.

Photographic Chemicals

The range of photographic chemicals available will meet the needs of the process engraver, the radiologist, the plan producer, as well as the professional or amateur photographer

Analytical and Research Chemicals

The laboratory and analytical chemicals produced by British manufacturers can now stand comparison with the products for which at one time it was considered essential to go abroad. There is a growing list of reagents specially prepared for particular purposes and inquiries for new products of this kind will be particularly welcomed. This group also includes the microscopic stains and dyes, in the forms needed for all branches of research.

Perfumery Chemicals and Essential Oils

The range of synthetics and isolates is being extended almost daily, and the display of products with special properties should be worth investigation by anyone interested in the compounding of perfumes who wishes to keep up to date. Essences for flavouring will be available specially prepared to comply with the statutory regulations as to purity in any country.

Rare Earths

The rare earth industry is now firmly established in England, and is able to offer a wide range of compounds for gas mantles, electric lamps, arc-carbons, glass and ceramics and pyrophoric alloys. One rare earth compound, mesothorium, is used medicinally, and also as an Empire substitute for radium in luminous paints.

Solvents

A section of growing importance is the production of new and improved solvents for fats, gums, oils, and also for plasticisers for the lacquer and varnish trades. The perfumery, soap, laundry and dry-cleaning trades will also be interested in these developments. As each product has special properties, a detailed description is obviously impossible.

Dyes, Intermediates and Allied Products

The British dye industry will be able to show once more the advances it has made, these being attributed by the Association to the assistance of the Dyestuffs (Import Regulation) Act. Fabric colours, though very important from the point of view of clothing and other materials, form only a portion of the types available, which include such widely different uses as leather, soap, inks, varnishes, rubber, films, cellulose lacquers, lakes, buttons, ivory, bath salts and paper. Food-colouring matters are becoming increasingly important and have to be specially prepared to conform to the very strict regulations imposed by most countries. Mineral colouring matters for use in the glass, ceramic and rubber industries are also found in this section.

Synthetic Resins

Moulded articles made from synthetic resins are gradually finding favour on account of their resistance to wear, appearance and insulating properties. A moulding plant in actual operation, with a comprehensive exhibit of articles made in this way will show the extensive range and indicate the possibilities of such materials.

Miscellaneous Chemicals

Many products not easily classified under one or other of the above headings, such as stone preservatives, special chemicals for electro-plating, including chromium plating, will also be shown. Indeed, it is stated that every industry will find the chemicals it requires in the Chemical Section of the Fair—British-made and of British quality.

German Coal Tar Cartel

CONVERSATIONS have been initiated with the object of prolonging for five years the German coal tar cartel (Verkaufsvereinigung fuer Teererzeugnisee G.m.b.H.), of Essen, due to terminate at the end of 1930. This cartel is composed of 11 German coal tar firms. Their total sales amounted to 1,100,000 metric tons in 1928, and it is thought that sales will increase to 1,250,000 tons in 1929, coincident with an increased coke consumption by the iron and steel industry.—(U.S.A. Trade Commissioner W. T. Daugherty, Berlin.)

General Improvement in Overseas Chemical Trade

The Best Month of the Year

WHILE the total figures for national exports and imports disclosed in the Board of Trade returns for November, cannot be considered good, the November returns of trade in chemicals, drugs, dyes and colours are the best of this year. Chemical imports have declined by £117,216 as compared with November of 1928, while chemical exports have increased by £266,107. For the eleven months of the year, there is an increase of £1,282,834 in chemical imports and of £664,215 in chemical exports. The detailed figures are given below:—

Imports

	Quantities Month ended November 30,		Value Month ended November 30,	
CHEMICAL MANUFACTURES AND PRODUCTS—	1928.	1929.	1928.	1929.
			£	£
Acid Acetic .....tons	905	2,785	41,485	102,817
Acid Tartaric, including tartrates, not elsewhere specified..cwt.	3,040	1,868	17,452	13,032
Bleachings Materials ,,	12,244	11,739	9,599	14,197
Borax..... ,,	3,220	25,293	3,123	14,918
Calcium Carbide .. ,,	68,640	112,499	42,395	67,593
Coal Tar Products value	—	—	27,438	9,002
Glycerine, Crude ..cwt.	100	20	219	52
Glycerine, Distilled ,,	99	1,275	378	3,034
Red Lead and Orange Lead .....cwt.	3,504	2,561	4,735	4,204
Nickel Oxide ..... ,,	49	68	228	322
Potassium Compounds—				
Nitrate (Saltpetre)cwt.	11,845	8,964	12,352	9,102
All other Compounds ,,	293,488	205,502	84,158	65,958
Sodium Compounds—				
Nitrate .....cwt.	130,132	133,149	64,824	61,287
All other Compounds ,,	48,344	49,546	32,684	35,107
Tartar, Cream of... ,,	2,683	2,754	11,754	12,669
Zinc Oxide..... tons	1,108	919	30,522	27,805
All other Sorts....value	—	—	545,904	349,884
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts..... ozs.	158,692	167,656	11,443	11,912
Bark Cinchona ...cwt.	2,596	2,222	10,482	10,191
Other Sorts.....value	—	—	156,958	172,747
DYES AND DYESTUFFS—				
Intermediate Coal Tar Products .....cwt.	94	145	1,221	1,940
Alizarine ..... ,,	80	175	3,158	3,701
Indigo, Synthetic . ,,	—	—	—	—
Other Sorts ..... ,,	3,212	4,307	75,018	99,745
Cutch ..... ,,	3,381	3,053	5,065	4,810
Other Dyeing Extracts cwt.	5,253	2,584	16,706	11,024
Indigo, Natural ... ,,	—	—	—	—
Extracts for Tanning ,,	87,848	61,546	89,837	60,713
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe .....cwt.	78,872	51,994	17,340	12,687
White Lead (dry) .. ,,	15,437	18,427	25,200	31,971
All other Sorts .... ,,	95,346	105,033	144,364	156,492
Total of Chemicals, Drugs, Dyes and Colours.....value	—	—	1,486,042	1,368,826

Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	13,698	13,830	4,171	4,174
Acid Tartaric .... ,,	1,264	1,639	9,234	11,481
Ammonium Chloride (Muriate)..... tons	449	406	7,935	6,855
Ammonium Sulphate—				
To Spain and Canaries tons	11,417	35,303	108,432	319,169
,, Italy ..... ,,	377	138	3,395	1,400
,, Dutch East Indies tons	111	393	1,098	3,732
,, Japan ..... ,,	9,498	17,611	91,670	164,889
,, British West India Islands and British Guiana tons	588	601	5,519	5,482
,, Other Countries ,,	11,052	17,661	106,700	165,594
Total ..... ,,	33,043	71,707	316,814	660,176
Bleaching Powder....cwt.	78,922	77,102	21,642	21,354

	Quantities Month ended November 30,		Value Month ended November 30,	
COAL TAR PRODUCTS—	1928.	1929.	1928.	1929.
			£	£
Anthracene .....cwt.	3	—	2	—
Benzol and Toluol..galls.	2,167	28,336	305	2,588
Carbolic Acid.....cwt.	19,979	21,906	36,066	29,873
Naphtha.....galls.	8,466	5,678	864	696
Naphthalene .....cwt.	3,906	6,493	1,784	2,169
Tar Oil, Cresote Oil, etc. galls.	5,103,233	1,867,118	167,229	52,519
Other Sorts .....cwt.	81,860	27,047	32,894	22,693
Total.....value	—	—	239,144	110,538
Copper, Sulphate of ..tons	2,793	1,844	64,788	44,422
Disinfectants, Insecticides, etc. .....ctw.	41,999	48,575	109,569	119,474
Glycerine, Crude ....cwt.	1,075	3,971	1,545	7,782
Glycerine, Distilled .. ,,	13,111	20,762	41,118	51,890
Total ..... ,,	14,186	24,733	42,663	59,672
POTASSIUM COMPOUNDS—				
Chromate and Bi-chromate .....cwt.	849	1,247	1,606	2,434
Nitrate (Saltpetre) ,,	1,213	930	2,256	1,756
All other Sorts .... ,,	4,146	3,008	15,694	11,670
Total ,,	6,208	5,185	19,556	15,860
SODIUM COMPOUNDS—				
Carbonate .....cwt.	431,808	538,368	120,250	142,327
Caustic ..... ,,	150,990	190,859	107,179	128,017
Chromate and Bi-chromate .....cwt.	4,347	2,468	5,990	5,920
Sulphate, including Salt Cake .....cwt.	315,075	224,292	34,718	23,470
All other Sorts .... ,,	55,520	79,888	72,630	93,054
Total ,,	957,740	1,035,875	340,767	392,788
Zinc Oxide .....tons	128	189	4,983	6,816
All other Sorts.....value	—	—	338,251	353,496
Total of Chemical Manufactures and Products...value	—	—	1,519,517	1,807,106
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts.....ozs.	171,585	189,672	15,153	20,080
All other Sorts....value	—	—	295,425	283,577
Total ,,	—	—	310,578	303,657
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	13,877	12,440	94,560	80,456
Other Sorts ..... ,,	10,499	10,161	13,156	12,043
Total ..... ,,	24,376	22,601	107,716	92,499
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe .....cwt.	3,576	6,271	2,203	2,269
White Lead (dry) .. ,,	3,632	3,215	7,293	6,831
Paints and Colours, in paste form .....cwt.	45,356	40,886	92,352	82,823
Paints and Enamels Prepared .....cwt.	49,369	50,599	149,378	156,449
All other Sorts .... ,,	59,627	59,216	105,351	108,861
Total ..... ,,	161,560	160,187	356,577	357,233
Total of Chemicals Drugs, Dyes and Colours.... value	—	—	2,294,388	2,560,495

Re-Exports

	Quantities Month ended November 30,		Value Month ended November 30,	
CHEMICAL MANUFACTURES AND PRODUCTS—	1928.	1929.	1928.	1929.
			£	£
Acid Tartaric.....cwt.	131	77	1,044	674
Borax..... ,,	641	12	556	9
Coal Tar Products value	—	—	33,835	9
Potassium Nitrate..cwt.	178	69	310	89
Sodium Nitrate.... ,,	2,130	1,445	1,151	719
Tartar, Cream of... ,,	647	280	3,122	1,533
All other Sorts....value	—	—	13,090	21,443
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....ozs.	30,486	39,456	2,909	3,825
Bark Cinchona ...cwt.	219	530	903	4,960
All other Sorts....value	—	—	35,171	33,236
DYES AND DYESTUFFS—				
Cutch.....cwt.	1,111	987	1,530	1,537
Other Dyeing Extracts cwt.	161	246	1,103	2,550
Indigo, Natural .. ,,	5	5	143	103
Extracts for Tanning ,,	907	890	1,099	1,425
Painters' Colours and Materials ..... ,,	982	3,334	3,326	5,686
Total of Chemicals, Drugs, Dyes and Colours....value	—	—	99,699	78,051

What of the Wochenals?

To the Editor of THE CHEMICAL AGE.

SIR,—The derivation from *Wochenblätter* will be obvious. I coin the word because of the danger of writing *Weaklies* and because a new departure is called for. You comment upon Dr. Ormandy's courage in telling chemists what he thinks of them and call the *Manchester Guardian* in his support; you seem to entertain not unfavourably the suggestion of one official journal to be published quarterly. "And so say all of us"—comes from the background; perhaps the refrain of a song in praise of the courage of one H . . . r. Still, charity should begin at home. What of the Weekly Journals? Are not these, too, like chemists, as irrational as anything could be? Think of the confusion in colour and number: *Blue Bits; Orange Bitters; the Aged White 'Un; the Pale Blue Bolus; the Yellow Pill-roller Peril*, etc.—not one seeing *Red!* Also, there is an all-pervading *Nature*, which is fast becoming an organ of prematurity, but also—if we are to believe Professor Bone—one of staleness, at least in its knowledge of acetylene; yet is displaying a wonderful breadth and setting a wonderful example of outspoken criticism. Be it whispered—it even encourages Marie Stopes! May we not hope that, some day, she will turn her attention from the excess of population to that of publication and prescribe methods of preventing the delivery of the still-born, the premature, and the worthless? The world has learnt how to deal with sexual problems; it has not yet begun to consider the scientific. We have only to think of the political muddlers who presume to govern us; to-day, probably not a man among them, unless it be the Prime Minister, can spell the word—S-c-i-e-n-t-i-f-i-c. Few can within our own circle. The danger of ignorance is a very real one; even a Soviet can command the services of science and use bombs. How can coal be dealt with by men who know it only in the scuttle; how can Education be considered by the Uneducated?

We have no *Wochenal* to deal with the real problems of our society—all are too *Kleinstädtig*, their outlook too narrow. They all give much the same information, differing mainly in colour of cover and format. Not one of them has room for critical discussions of moment. All speak with bated breath. Not one of them pays a living wage to the contributor. The publishers of scientific books seem ashamed to advertise them even along with their naughtiest novels; they make their existence known mainly by an underground method—by circularising people who are not students and rarely buy on such asking. They indeed live in a well of loneliness and no Jix is needed to ban them. Reading will ere long be a lost art—students cannot afford to buy any but a few cram books in their subject. Soon, we shall no more be able to say, with Mortimer:—

> In faith, he is a worthy gentleman,
> Exceeding well read and profited
> In strange concealments.

There has been some rise in the pay of laboratory workers in recent times. The poor scribbler in science remains where he was and receives only an insultingly small pecuniary temptation even from the official organs. What little literary ability is in us cannot be developed for want of opportunity. You must be a Dean preaching values or a Telepathist, a transcendentalist, to make money out of words; you then do it because there is nothing real behind the words—only fancy. People love to be gulled—especially those who study the higher science of to-day. The touch of scientific method is scarcely upon us. In some way we *must* secure its common use!

The weeklies are not helping us—they are crowded with loose information, but never discuss issues in any serious manner. We fail to recognise how overfull of fact is the field of science—how much our knowledge needs to be coordinated.

So much space is wasted in what seems to be unnecessary repetition and overlapping. Why, for example, should each separate weekly devote page after page to market prices? There can be no proportionate use made of such information. Admitting the need for the habilitation of chemists and all their works, it is equally true that the organs of opinion upon their flanks are also in need of repair. Even to-day, the editorials are often the most informative articles—these might often be expanded into considered essays with advantage. Some fusion of interests should be effected which would give us a real journal, fit to be placed upon club tables and to be sold in protection of the public; a combination, let us say, of a chemical *Nature* with the *Saturday Review* of olden times, commanding the services of the best writers and critics of the day.

The Salvationists have a *War Cry*. Chemists may well seek to train up a General Booth and to run a *Wochenal* worthy of their cloth.—Yours, etc.,

AN ANXIOUS ONLOOKER.

A Science Party

To the Editor of THE CHEMICAL AGE.

SIR,—The article by Mr. W. P. Dreaper in your issue of November 16 is amongst the most interesting of any printed in THE CHEMICAL AGE. It is remarkable how small a representation science enjoys, or rather suffers, in Parliament. This is due to the fact not that its importance is minimised, but that scientific men appear to have few ambitions in political directions. But having regard to the fact that with every day political programmes come to depend more and more upon industrial expediency, and to the fact that science and industry become always more closely allied, it is certainly time that scientific men gave more serious attention to politics.

The question of the formation of a party is certainly a large one. There have to be considered, among many other things, such questions as funds, public support, and the training of Parliamentary candidates. In regard to funds, assistance might be expected from the large corporations. The matter of public support is a much more difficult proposition. There should be no difficulty at all about the programme, regarded from the scientific point of view, but it has to be remembered that a water-tight programme might be produced which the public would not support, because it could not understand it. The solution of this serious problem depends upon the third question of training Parliamentary candidates. It is their business to place before the electorate a programme in a form that it can assimilate. These points can all be covered if a sufficient number of scientific men can be found able to overcome what appears to be an instinctive dislike for public life. It is necessary that science should be popularised in a way that should cause it to gain, and not lose, prestige. If this can be done, the preliminary difficulties at least will quickly be overcome.—I am, etc.,

HENRY T. F. RHODES,
Editor, *The Chemical Practitioner*.

British Association of Chemists,
175, Piccadilly, London, W.1.

Germany Joins the International Union

THE VERBAND DEUTSCHER CHEMISCHE VEREINE, an organisation formed by the Bunsen-Gesellschaft, the German Chemical Society, and the Union of German Chemists, has joined the International Union of Pure and Applied Chemistry.

Chemical Engineers' Associateship Examination

Papers Set This Year

The papers set at the recent examination for the Associate-Membership of the Instituti onof Chemical Engineers have now been released for publication. Four papers were set (one to be done at home), of which two are reproduced below.

Home Paper, January-March, 1929

The candidate may attempt one question only under section A, and one question only under section B. The answers must be made upon foolscap, squared paper and high-class drawing paper of convenient size, not exceeding 30 by 22 inches; each sheet or drawing must be signed by the candidate and the declaration enclosed must be filled in and witnessed. Little credit will be given for correct answers when the method of attack of the problem and the calculations are not given. Where the slide rule is used, the method should be indicated. Correct graphical solutions will be credited with full marks.

SECTION A.

1. Prepare a full set of flow sheets relating to the manufacture of 90° Tw. caustic soda and hydrochloric acid and bleaching powder by electrolysis of brine. Assume that 26 cells of the diaphragm type will be available, each with rating of 1,500 amps. at 4·25 volts, and that the weak solution from these cells will contain 125 gm. NaOH and 140 gm. NaCl per litre, and draw up specifications and estimates covering :—

(*a*) Steam and power plant.
(*b*) Caustic soda plant.
(*c*) Bleaching powder plant for utilising half the chlorine output.
(*d*) Hydrochloric acid plant for utilising hydrogen and remainder of the chlorine.

Prepare a layout drawing of the installation and an estimate of the approximate return on the capital expenditure under present market conditions.

2. Design a plant for the manufacture of 5 tons a day of 24 hours of acetic anhydride from a recovered acetic acid containing approximately 20 per cent. acetic acid by conversion into sodium acetate and treatment with sulphuryl chloride. Draw up flow sheets for each stage of the process on which the balance of materials, energy, etc., are recorded and make specifications and estimates covering the entire plant. Make a general arrangement drawing of one unit of the apparatus. Report on the overall cost of the process.

3. Draw the general layout and give a flow sheet for a plant to manufacture 5 tons per day of 24 hours of mono-nitronaphthalene from pure naphthalene, sodium nitrate and sulphuric acid. Calculate the sizes of the different parts of plant, specify the materials from which they are to be made, and state what you would consider to be a reasonable allowance for depreciation in each case. Estimate the cost of production. The principles on which the layout is arranged should be clearly stated.

4. Design a plant for the manufacture of 95 per cent. alcohol (by volume), using 3 tons of maize per day of 24 hours as raw material. Draw the layout of the plant and give sketches showing important details. Estimate the overall cost of production. A detailed design of the still is not required, and, for the purpose of this question, any restrictions imposed by Excise regulations need not be considered.

SECTION B.

1. Write an essay on the design of high pressure autoclaves for the manufacture of intermediate products for dyestuffs, incorporating a statement of the physico-chemical principles on which working pressures are predicted, special precautions in mechanical design and illustrate by calculating out a detailed design for an autoclave for the manufacture of dimethylaniline on a large scale. Prepare a drawing from which such an autoclave could be built by any engineering works having suitable facilities.

2. Write an essay on the principles of design of fractional distillation plant. Design a fractionating still for use in connection with the separation of ortho- and para-nitrotoluol from the usual mixture obtained by nitration of toluol, and compute approximately the thermal efficiency of the apparatus under what you consider to be practical conditions of operation.

3. 2,000 lbs. per hour of dry saturated benzol vapour at atmospheric pressure enter a counter-current condenser consisting of 20 copper tubes, each of which is 25 ft. in length. 650 gals. per hour of cooling water, with an initial temperature of 60° F. are passing inside these tubes, which have an internal diameter of 0·375 in. and an external diameter of 0·559 in. To what temperature is the condensed benzol cooled, and what is the exit temperature of the cooling water? How much of the tube surface is being used for condensing the benzol vapour, and how much is being used for cooling the condensed benzol?

Assume coefficients of heat transfer :—

Water to metal	.. ..	500 B.Th.U./hr./sq. ft./°F.
Condensing benzol vapour to metal	.. ..	350 ,, ,, ,,
Liquid benzol to metal	..	40 ,, ,, ,,

4. In an experimental run at constant pressure on a leaf filter, the following data are obtained connecting the volume of filtrate and the time of filtration :—

Vol. of filtrate—	·5	1	2	3	4	5	6 cu. ft./sq. ft. of filtering area.
Time—	·12	·28	·72	1·32	2·07	2·98	4·06 hours.

Under these conditions, find the maximum output of this filter and the volume (per sq. ft. of filtering area) to be filtered at each operation in order to give the maximum output. The filter-cake is to be washed with a volume of water equal to one-fifth of the volume of filtrate and the time required for emptying and reassembling the filter is 30 minutes.

5. An open cast iron tank 2 m. diameter by 3 m. deep is filled with water at 95° C. and exposed to still air. Plot the cooling curve from 90° C. to 30° C., assuming the atmospheric temperature to be 15° C., with a dew point of 10° C. What would be the weight of water evaporated in that time? All formulæ employed should be given.

Paper Set Thursday, July 11th, 1929, 10 a.m.-1 p.m.

Three hours are allowed for this paper. The candidate may use the reference books provided. Four questions only may be attempted, two to be taken from each part of the paper. Little credit will be given for correct answers when the method of attack of the problem and the calculations are not supplied. Where the slide rule is used the method should be indicated. The questions are not intended to test a knowledge of particular formulæ or industrial makes of plant. Full marks may be obtained by an answer which shows an appreciation of the salient principles involved and an ability to apply these to the purpose in view.

SECTION C.—PART I.

1. What do you understand by turbulent and stream line flow? Give the criterion. A liquid of density 0·792 grs. per c.c., having a viscosity of 0·0033 c.g.s. units at 20° C. flows through a 1 in. pipe. Calculate the approximate velocity at which stream line flow breaks down and turbulent flow begins.

2. Describe any apparatus you would use to determine the calorific value of a fuel. One gramme of oil was burned in a bomb calorimeter containing 2,200 grs. of water, the water equivalent of the instrument being 481 grs. The following observations of the temperature were recorded :—

	Preliminary Period.					
Time in mins.	0	1	2	3	4	5
Temp. °C. ..	10·23	10·23	10·24	10·24	10·25	10·25
	Burning Period.					
Time in mins.	..	..	5½	6	7	8
Temp. °C. ..	..	..	10·80	12·90	13·79	13·84
	Subsequent Period.					
Time in mins.	..	9	10	11	12	13
Temp. °C. ..	..	13·82	13·81	13·80	13·79	13·78

Calculate the calorific value of the oil.

3. Sulphur of 99·4 per cent. purity is burned at the rate of 700 lb. per hour. The air enters the burner at a temperature of 15° C. and the gases leaving at 760° C. contain 17·4 per cent. SO_2 and 2·7 per cent. of O_2 by volume.

What is :—

(*a*) The percentage of SO_3 formed in the gas?
(*b*) The weight of sulphur dioxide produced per hour?
(*c*) The volume of air required?

4. What do you understand by the coefficient of heat transfer and determine this in the following case. A pipe 1¼ in. diameter by 20 ft. long is surrounded by a second pipe 2 in. in diameter. 850 gals. of water per hour enter the inner tube at a temperature of 220° F., and leave at a temperature of 120° F., whilst another liquid flows in the opposite direction through the annulus, entering at 60° F. and leaving at 190° F.

5. A steel pipe 4 in. in diameter by ¼ in. thick carries steam at 100 lb. per sq. in. pressure (gauge). The outer surface of the pipe is covered with a layer of asbestos 2 in. in thickness and is surrounded by air at a temperature of 15° C. Calculate the temperature of the outside of the asbestos, if the conductivity of the asbestos is 0·216, and of the iron 40·68 cals. per sq. m. per °C. per m. thick per hour. Heat loss from the asbestos surface =

$3{\cdot}65\ (T_a^4 - T_b^4) \times 10^{-8} + 3\ (T_a - T_b)^{1.23}$ Cals./sq. m./hr.

Where T_a is temperature of surface, and

T_b is temperature of surroundings.

Cals. = large calories.

SECTION C.—PART II.

6. Describe the air lift pump, and state how the energy supplied to the pump is utilised or dissipated.

7. Give the cycle of operations in any type of refrigerator with which you are acquainted. State the various materials used as refrigerants and indicate briefly the importance of refrigeration to the chemical engineer. State how refrigerating machines are usually rated and discuss critically the value of such ratings.

8. Describe with sketches one only of the following :—

(*a*) A gas-fired reverberatory furnace for calcining material at 1,000° C.

(*b*) A furnace suitable for burning sulphur.

(*c*) A muffle furnace.

9. Describe with good sketches the type of plant you would propose to instal for the movement of any two of the following materials :—

(*a*) Hot coke from a gas retort.

(*b*) Very short pieces of cotton which have just left a drying machine and have to be moved to a higher level for packing.

(*c*) Powdered cement from the ball mills to the silos in a cement factory.

(*d*) Salt coming from a large vacuum evaporating plant.

10. Sketch a brickwork setting suitable for a tar still. What would be the effect of reducing the cross-sectional area of the flues whilst maintaining the same heating surface on the still ?

New Directors of Benn Brothers

Selections from the Staff

THE addition last week to the board of directors of Benn Brothers, Ltd. (publishers of THE CHEMICAL AGE), of Miss F. Robinson and Mr. F. E. Hamer is an event of double significance. On the one hand a distinguished woman member of the staff joins the board—the first time that the signal honour of a seat on the directorate has been conferred upon one of her sex. On the other hand, the traditional policy is continued of appointing directors working in the business (of which the board is entirely composed), and a still larger proportion of its members now consists of those who have been long associated with the firm as working members of the staff and shareholders. Miss Robinson has been for a long period secretary to Sir Ernest Benn (chairman of the company) and staff manager, and Mr. Hamer is a well-known journalist who has edited THE CHEMICAL AGE from its establishment. Made on the eve of the Jubilee Year of Benn Brothers, Ltd., these two appointments have not only given a lively pleasure to the colleagues of Miss Robinson and Mr. Hamer at Bouverie House, the firm's headquarters in Fleet Street, but have created widespread interest and brought many congratulations from their numerous friends in the world of technical and trade journal publishing.

The directors of Benn Brothers, Ltd., have declared the usual dividends, less tax, payable on February 15, 1930, viz. :—3 per cent. on the preference shares for the half year ending December 31, 1929, and interim dividends of 6¼ per cent. on the ordinary shares and 1s. 3d. per share on the deferred shares.

China Clay Imports—November, 1929

A RETURN showing the quantities and value of China Clay, including China Stone, imported into Great Britain and Northern Ireland, as registered in the month of November 1929, is as follows :—

COUNTRIES WHENCE CONSIGNED.	QUANTITY. Tons.	VALUE. £
Germany	9	99
Netherlands	—	1
U.S. America	26	158
Total	35	258

China Clay Exports—November, 1929

A RETURN showing the quantities and value of the exports of China Clay, including Cornish or China Stone, the produce of Great Britain and Northern Ireland, from Great Britain and Northern Ireland, as registered in the month of November, 1929, is as follows :—

COUNTRY OF DESTINATION.	QUANTITY. Tons.	VALUE. £
Finland	3,778	6,098
Estonia	10	36
Sweden	2,063	4,570
Norway	1,149	1,555
Denmark	707	1,973
Germany	3,874	8,300
Netherlands	3,004	6,570
Belgium	3,355	6,308
France	1,036	1,593
Switzerland	51	108
Canary Islands	1,007	2,179
Italy	616	1,551
Greece	19	68
Egypt	17	50
China	10	58
Japan	30	353
United States of America	23,572	50,405
Mexico	15	65
Uruguay	2	15
Irish Free State	7	26
Union of South Africa	2	28
British India, via Bombay	1,715	7,886
Via Madras	4	16
Via Bengal, Assam, Bihar and Orissa	226	856
Via Burma	—	1
Australia	57	385
Canada	377	1,739
Total	46,703	102,792

The Fine Chemical Industry

Relation to Other Aspects of Production

ALTHOUGH the fine chemical industry did not employ a large number of men, it exerted an important influence over a large number of other industries, said Mr. Leonard Anderson, manager of the fine chemical department of Boots Pure Drug Co., Ltd., in a lecture at the University College, Nottingham, on Wednesday, December 10. The meeting was held under the auspices of the Nottingham branch of the Society of Chemical Industry, Mr. Anderson taking as his subject "Some Economic Aspects of the Manufacture of Fine Chemicals." Dr. F. L. Pyman presided.

In explaining his remark as to the effect on other industries, Mr. Anderson instanced the discovery of a product like "bakelite," which was used as a substitute for bone and ivory in the manufacture of serviette rings, insulators and ladies' powder bowls. Mr. Anderson advocated closer co-operation between manufacturers and universities, by way of grants for research, which was usually carried on by eminent professors who had made particular fields their own, and were better able to guide research in those particular fields.

There was a large fine chemical industry in this country before the war came along and gave it a big fillip, and to-day fine chemical manufacturers formed a very important section of the chemical industry. Both competition and co-operation were essential for healthy life in industry. Co-operation between manufacturers could be obtained either by rationalisation or by what he thought suited the English temperament better, partial amalgamation, and then the association of a few firms in a trade association.

The Dyestuffs Patent Action

The Case for the Petitioners

Below is given an account of this week's proceedings in the patent action now going on before Mr. Justice Maugham between I.C.I. and the I.G. Accounts of the earlier proceedings appeared in this journal in the issues of November 23 and 30, and December 7 and 14.

On Thursday and Friday, December 12 and 13, Mr. Stafford Cripps continued his speech on behalf of the petitioners. Dealing with selection patents, counsel said that his lordship would appreciate that it was an extremely important point to the chemical industry of this country, because the industry was extremely anxious to know whether once a general claim had been made, such as the claims in the 1912 and 1913 patents, it was competent for people thereafter to take out such patents as those which were in suit here within the area of the wider field claimed by the original claim. His lordship would appreciate, and counsel had already said, that if that was possible, the result was that at the end of the first period of monopoly, which had now expired (and that was, of course, why this case had come on, because the 1912 and 1913 patents of the respondents expired last year and this year), the field should presumably be open to the public under the 1912 and 1913 patents; but instead of the field being open, the petitioners had, and he daresay others had, found that when they came to want to use the field, it was again fenced round by those subsequent patents dating from 1922 up to the present time which effectively kept them off the field, although nominally it was open to them.

The Judge's View

His lordship: I should be inclined to say that the fact that there had been a field limited in a previous patent, does not, as at present advised, prevent fresh discoverers digging in that field and finding buried treasure here and there; but they have to satisfy the Court that they have found buried treasure.

Mr. Cripps submitted that these properties naturally wanted and desired for cotton processes, which were well known to include keir boiling, was merely a mangel crop as against a wheat crop or anything else.

His lordship: As I understand the other side, they do profess to prove that the property of being fast to keir boiling in azo dyes was quite unknown until their patents were put upon the market.

Names and Constitution of Dyestuffs

Mr. Cripps: In my submission that would not be enough They would have to prove that the property of keir boiling was not a property which would be looked for normally and naturally in dyestuffs, and for dyeing cotton. Your lordship has heard that these dyeing people have not the vaguest notion what these dyestuffs are made of. They get a Naphthol A.S./W. and a Fast Red K.B.; they buy them on the market. Your lordship will hear from Professor Rowe that it was not until he analysed a lot of these materials in 1924, 1925 and 1926 that they were identified as regards the public in this country at all. It is a perfectly natural and proper desire of the patentees. If they put a thing on the market, they do not want to put it on in its chemical name. They put it on as a Fast Red G.L., for instance, and it is their proprietary article, as it were. They know what it is and they tell people how to use it, but they do not tell them what it is made of. All these big dye makers have their own series of names. The Fast Reds, no doubt, are the I.G.'s property, which nobody would infringe, of course.

It would have been perfectly possible for the respondents, if they had so desired, to limit their earlier patents of 1912 and 1913 to the anilides without including every substitution product and homologue, and then it would have been open to anybody else to make any of the new substances and take out patents if they found valuable results or not, as the case might be, if they had thought of doing it and if they had gone on with the experiments. But if the original patentees, instead of taking out a patent solely for the anilide, cover the toluidides and the anisidides, or other bodies, as well, then they cannot have the original 16 years' protection and then get a renewed protection when they come along and say, We have now had time to manufacture them and look into their properties, and we find that they have good properties as regards keir boiling, and so we want another protection for another 16 years on the strength of that. Your lordship will see that that is the public objection to selection patents in this form, unless there is something in the selection which is something that nobody investigated, that it is a range of dyestuffs for the uses to which they are naturally put, and that is, dyeing cottons, which anybody would be likely to come across. Merely to test some portion of his field, which he tests when he likes and developes as he likes during 16 years, and finds certain results, cannot, in my submission to your lordship, possibly be subject matter for a patent.

Mr. Cripps drew attention to the claims of the respondents in regard to the patents, and said all the first claims were substantially in the same form: "The herein described manufacture of azo dyestuffs by combining any diazo compound with a para-toluidide or a para-alkyloxy anilide of 2 : 3-oxynaphthoic acid, toluidide or anilide being halogen substituted in an anilide group." It was a general claim to the manufacture of dyestuffs. The whole of that had been disclosed before the whole of that which was there claimed. As he understood the respondents' case, it was this, on prior art, that no one would ever think of an azo dyestuff in relation to kier boiling at all, nor, indeed, of any dyestuff except Turkey Red and Aniline Black.

Keir Boiling

Dr. Oberlander had said that these constituted epoch-making inventions after years of stagnation. Counsel wanted to controvert that proposition. So far from it being a fact that people would not turn to these azo dyestuffs for bleaching processes where keir boiling was necessary, the evidence was quite clear that in fact these azo dyestuffs were used in processes before 1922 where a bleaching process was necessary, which process had in it a keir boil, which, in fact, was the same kier boiling that was used to-day for similar groups.

Counsel, replying to a question from his lordship on what was fastness to keir boiling, said, first of all there was: What is kier boiling, and then there was: What is fastness. He had addressed his lordship on fastness. Fastness was what was understood in the trade as the standing up of a dye to the process. How much was it to stand up to, and roughly the difference between the petitioners and the respondents was that the respondents said: "Well, it need not stand up very much; as long as it is not really substantially changed it is fast." The petitioners would tell his lordship in their evidence that that was not in the least so when you were dealing with commercial conditions in this country. What an ordinary person might call a very slight change in tone was quite sufficient to render it not fast.

His lordship: That is an argument as to what is fast to keir boiling. The most stringent are the two meanings which are suggested here.

Mr. Cripps agreed. He submitted that here on the first broad point, the claim was bad, because that part of it which covered the use of these dyes for purposes other than yarn dyeing for shirtings, dooties and towellings, had no subject matter. There was nothing to support the alleged selection in this case. What had been attempted here in specification 199,771 was not to get a fresh monopoly for the limited area in which the selection was useful, but to get a complete monopoly for the whole manufacture of dyestuffs. It was nothing but a repetition of the claim of 6,379 or 17,279. Therefore, in his submission, this claim, and all the claims in the specifications, none of which were limited in any way to the use for which the selection was made, must be bad for want of subject matter.

An Interesting Point

His lordship pointed out that legislation which dealt with one claim being good and one being bad, had a most extraordinary result. A man who was drafting a patent specification could now put all the matters of doubt, as to which he was uncertain as regards the scope of his authority, in the form of a different claim. He had perhaps 19 claims, the

whole of which were speculative, and only one which he thought he could support. He could put that at the end, and then he was going to start having a monopoly of all sorts of things for which he ought never to have a monopoly at all. Then, after 16 years, the thing came into Court, and the Court, instead of saying that the whole of this and everyone of these claims was bad, because they had claimed far more than they ought to have claimed, was practically bound to say, Claim 20 is good and you can have relief in that respect. He was putting this rather as one of his difficulties in finding out what the limits of the amendments were. He thought the section with regard to succeeding on one claim when the rest of the claims were bad was extraordinary. From the Patent Law, a patent which was admittedly bad could be amended, and it would be good. He could not understand it.

Professor F. M. Rowe said he had been since 1916 entirely engaged with dyes and their application. He was familiar with the dyeing of cotton with insoluble azo dyes, and also with the methods in use at dyeing and bleaching establishments in this country, and he was consulted by persons interested in these works when difficulties arose. He was a member of the Committee set up by the Society of Dyers and Colourists to investigate the question of fastness of dyes, and to arrive at a standard of the various degrees of fastness. Having regard to the state of knowledge of the art, both chemically and industrially, there was, in his view, no inventive step disclosed in the claims made in the German specification.

On Wednesday, Mr. George Edward Holden, managing director of the English Velvet and Cord Co., Ltd., which includes Joseph Clare and Co., dyers and bleachers, and chairman of the Manchester section of the Society of Dyers and Colourists, said he had had 25 years' experience of bleaching, and he was familiar with the various yarn dyeing processes. Coloured yarns mixed with grey cotton were dyed upon keir-boiled cotton, and sometimes bleached as well. At his works these goods were submitted to a soda ash boil, and afterwards washed and slightly bleached as well. With regard to grey cotton, that was boiled in strong caustic soda in a keir under pressure, and afterwards washed and bleached. The strength of caustic soda varied from ½ to 2 per cent. and the strength of soda ash was ½ per cent.

About 1922, the expression "keir boiling," as applied to ordinary grey cloths, meant keir boiling under pressure with caustic soda. With yarns and fancy cloths it meant keir boiling not under pressure with soda ash. About that time, the minimum period for keir boiling any goods was six hours, but it might extend to 20 hours. He first knew of the introduction of fast dyes into bleaching processes about 1912.

The witness went on to say that bleachers and dyers had to pay if the colours were not satisfactory, and as that was a very expensive matter they tested goods that had to be dealt with in the laboratory. Where the liquor used was soda ash, they used the same strength in the laboratory, but with caustic soda they used double strength, because one could never tell how caustic soda would act. It was not until two or three years after the war that bleachers and dyers used Naphthol A.S. compounds in shirtings mixed with fast colours. For bleaching processes it was considered necessary to have a large margin of safety. He detailed experiments carried out at his works for Professor Rowe, and said he had judged between 800 and 1,000 hanks of yarn.

Mr. Frank Sharples, of Chadwick and Co., Oldham, dyers, bleachers and finishers, gave evidence, and this closed the petitioners' case.

Sir Arthur Colefax, K.C., for the Comptroller of Patents, said that the Comptroller took the view that this was a case where amendment would make the invention claimed substantially different from what was claimed in the specification.

Medal for Dr. Langmuir

THE CHANDLER MEDAL for achievement in science has been awarded by Columbia University for 1929 to Dr. Irving Langmuir, president of the American Chemical Society, and associate director of the research laboratory of the General Electric Company. Dr. Langmuir received the medal at a gathering of scientists in Havemeyer Hall, Columbia, on Friday, December 13, when he delivered the annual Chandler Lecture, taking as his subject "Electrochemical Interactions of Tungsten, Thorium, Caesium and Oxygen."

Chemistry at Glasgow University

Need for Further Equipment

THE annual Ramsay dinner was held in Glasgow on Wednesday, December 10, a large company, representative of various chemical and allied societies, being present. Professor F. G. Donnan, F.R.S., acted as chairman.

Principal Rait, proposing the toast of "The Profession of Chemistry," gave an account of the beginnings of the great chemical school of Glasgow University. In 1727, he said, it happened that there was a vacancy in the Chair of Oriental Languages, and in the course of that vacancy the large sum of £30 accrued to the University. The Professor of Medicine, the famous Dr. Cullen, suggested that this windfall should be expended in forming a department of chemistry in the University of Glasgow. The Faculty of the time not only devoted the £30 to that purpose, but in its liberality added the sum of £22. In the following year Dr. Cullen presented his bill for starting the department, and it was not £52 but £136. That was a kind of parable of what happened and what was still happening in not a few phases of the kind to-day. (Laughter.)

Dr. Black's Reign

The next step came under Dr. Cullen's successor, Joseph Black, who bore a still greater name in chemistry. Black, appearing before the Faculty one day, complained that his laboratory was in a most disgraceful condition. He described it as having an earthen floor and unplastered walls. He persuaded the Faculty to spend the sum of £350 on making a laboratory in which, as he put it, he could ask a student to do some work. From that period, in the middle of the 18th century, there grew the chemical departments of Glasgow, and it was in 1818 that the first Chair, the regius Chair, of Chemistry was founded. The first holder of the Chair got the University to build another laboratory in Shuttle Lane. Principal Rait said it was significant of the eminence as chemists of the heads of the Glasgow Department that of the eight men who occupied the position from 1747 till 1874, seven were enshrined in the *Dictionary of National Biography*.

The unfortunate conditions with regard to the implements for teaching and studying chemistry in 1747 were, his colleagues told him, there again to-day. Their Chemical Department was now ancient. The buildings had been temporary for so long a time that they had become almost venerable in their temporaryness. (Laughter.) One of the problems the University would have to face in the near future was the provision of something like proper accommodation for their great chemical department, which had been recently extended by the generosity of Sir Frederick Gardner and Mr. William Gardner. The demands for both teaching and research in chemistry had increased, and to be duly equipped for the service that was now called for the University would be glad to receive any help that the profession was prepared to give. After an allusion to the provision made by the late Professor Perkin of Oxford for the establishment of scholarships in chemistry, Principal Rait said that was an illustration of the kind of endowment which it seemed to him was necessary not only for the welfare of the University but also for the welfare of the great chemical profession.

A Challenge to Scotland

Professor Donnan, in the course of his reply, said that we as a nation had yet to learn to think chemically or scientifically. He went on to refer to the desirability that Glasgow University should be equipped with a fine chemical laboratory. Such a need would only require to be mentioned in New York and the money would be immediately forthcoming. That great country realised the enormous importance of chemical research for securing the health, happiness and very existence of the modern state. He thought the money could be got in this country—Glasgow and Scotland was surely not so poor as all that. It was really a disgrace to the great Scottish nation that the money had not been got long ago. He hoped there would soon be at Glasgow University a laboratory worthy of its staff and of its traditions.

Colour Testing and Fastness to Light

Papers Read before the Oil and Colour Chemists' Association

Papers by Mr. C. D. O. Winslade on colour testing and by Dr. H. J. Stern on fastness to light were read at a meeting on Friday, December 13, of the Manchester Section of the Oil and Colour Chemists' Association.

MR. WINSLADE, in a paper entitled "Some Aspects of Colour Testing," said that the usual method of rubbing the pigments out in linseed oil to a paste and then applying them in two contiguous strips on a clean piece of glass was well known. There was another method, however, and one which at first glance appeared to be a very practicable one. A drying medium could be made up somewhat as follows: 15 parts by weight of refined linseed oil, 3 parts of white spirit, and 1 part of a good liquid drier. A definite weight of each of the pigments to be compared could be taken—2 to 5 grams, depending on the specific gravity of the pigments—and the oil absorption determined with this medium. The pastes could then be thinned out with about one and a half times the amount of medium required to give the oil absorption paste. They would then have two ready mixed paints which were reasonably comparable, and these could be brushed out on a sheet of sized paper and allowed to dry, when the self colours could be compared.

Advantages of the Second Method

This method, said the author, had several advantages: It was testing the colour as it would be used; it showed up any serious differences in cpacity; it gave an indication of whether the colour would change on drying, due perhaps to the "floating up" of a constituent pigment; it exposed any dry-inhibiting properties the pigment might have; it showed any difference in oil absorption as a matter of routine; and the paper rubbing could be cut up and filed much more easily than bulky and heavy glass slides. Unfortunately, however, the method also had several big disadvantages. So much depended on the actual brushing out operation, and the human element was so much in evidence, that one could very easily get wrong results. A great deal depended upon the thickness of the coat of paint, particularly with pigments of a rather transparent nature. The glass rubbing method and the paper rubbing method very often failed to give concordant results. A difference in shade at once noticeable on glass might not be perceptible on paper, and vice versa.

In another method, the colours to be compared were rubbed out in oil to a brushing consistency. This was found by experience to need, with the majority of pigments, an amount of oil equal to 2½ times the oil absorption of the pigment. It was essential to put a thick coating on the glass to obtain an opaque layer. This method was found to give good results and to be much more fool-proof than the previous methods. Among its advantages were that it showed up any tendency on the part of the pigment to "float up" badly, and gave a better idea of the true colour of the pigment than when it was rubbed out as a fairly stiff paste. It was essential that the two pastes should be laid on the glass slide in the same direction or serious errors might result, especially with blacks. The oil content did not, of course, affect the shade of every pigment, but a very large number were affected, including ochres, Turkey red oxides, Indian red oxides, and a large range of organic colours.

White Pigments

The comparison of white pigments was a rather different proposition, as they did not change appreciably with the addition of more oil, except that the whiteness might be spoiled a little by the colour of the oil. Pale refined oil should, of course, always be used, and the white pigment should be rubbed out fairly lightly and quickly to a smooth paste just soft enough to go on glass easily. Of the white pigments, probably zinc oxide was one of the most troublesome to test, because of its rather transparent nature. For that reason it was essential to have a heavy opaque coating on the glass. Any thin places appeared slightly grey due to dark objects behind showing through to a small extent. White lead could also be a little troublesome, owing to a kind of sheen which it sometimes had, and which made it appear different in shade according to the angle from which the glass was viewed.

When the staining power of a pigment, as shown by the reduction tests, was considered, it was found that the amount of oil in the paste did not matter a great deal, but it was best to follow the same principle as in the case of self-colours and to have the paste of brushing consistency. It was a generally recognised practice now to use zinc oxide for reductions, but a few people used other whites such as white lead and lithopone.

Dr. Stern, who delivered a paper on "Fastness to Light," said that no one entering industrial work involving the use of pigments could fail to be impressed by the great importance of light fastness, and also by the haphazard and unscientific manner in which light fastness was generally described. It must be remembered that the same pigment might be used for different purposes, so that a description such as "of good fastness" might be fairly accurate when the pigment was used in one way, but not when used in another. The problem of colour fastness to light was not simplified by the extreme enthusiasm, not always justified, that was displayed by some colour makers. He understood that the legal view of "fast to light" was "absolutely fast to any amount of light." It was no doubt for this reason that most firms of repute refrained from giving any such absolute guarantee, preferring to give a description by words or figures.

Chaos of Present Methods

The present commercial methods employed by dye makers to describe light fastness were chaotic. The position with regard to lakes was not quite so bad, however, in some respects, as that for textiles, where certain firms gave the fastness of colours compared with one another as a class—acid, basic, and so on. Before the formation of the German I.G., Bayer and Co. used to mark patterns with a star and say that these were distinguished by good, some even by very good, fastness to light. The Badische gave no particulars of light fastness in general, but issued a separate list of fast-to-light colours. Meisters had a division into "very fast," "fast," and "ordinary," which suffered from the great objection that the last class ranged from Eosine to acid colours of much greater fastness. Dr. Stern stated that, according to his latest information, the I.G. had not definitely adopted any of these schemes, but described fastness as compared with a standard presumed to be known by the user—usually the colour was compared to madder.

The Geigy Colour Co. had informed him that they had never used the "one to five" numbering, but that they saw no reason why they should not. Their lake classification was formerly "very good," "good," "fairly good," "moderate," and "poor." Eosine and madder were given as examples of the first and last classes. The British Dyestuffs Corporation also had five classes—"excellent," "very good," "good," "fair," and "poor." Thus, in the latter case, "very good" was a second grade of fastness, whereas in Geigy's original classification it represented the highest and fastest grade. It was easy to see the confusion which would arise from the consumer's point of view. Then the Colour Makers' Association also recommended the adoption of five grades, but they described them as "excellent," "very good," "fairly good," "moderate," and "poor."

A Scheme of Classification

Suggesting a scheme of standard classification of pigments, Dr. Stern said Grade 1 would include many organic pigments—chromes, ultramarine, earth colours, etc., and the fastest organic colours, such as Hansa Yellow and Helio Fast Red. These two pigments, however, were commercial products and liable to variation. For standards in this grade he would suggest Indanthrene Blue and an Alizarine lake. The latter must, of course, be prepared according to a standard method, and the Indanthrene Blue mixed with a fixed proportion of a specified base. As standards in Grade 2 he would suggest Eriochrome Red PE and Durasol Acid Blue. Grade 3 would include most of the acid colours—acid greens, acid scarlets, Ponceaus, etc. As a red standard, he would suggest Ponceau RG. They had no lack of examples for Grade 4, the acid violets, Methyl Violet, Magenta, Rhodamine, and Eosine, all giving lakes which fell into this grade.

Zinc Oxide Manufacturer's Action

Judgment for Mr. James M. Brown

JUDGE Shewell Cooper, in the Mayor's and City of London Court, on Tuesday, December 17, heard an action brought by Mr. James M. Brown, zinc oxide manufacturer, of 35, Surrey Street, Strand, against Fenner and Alder, Ltd., paint manufacturers, of 120, Fenchurch Street, E.C., for £82 10s. balance due on a contract for zinc oxide. Mr. Grundy was for the plaintiff, and Mr. Ricardo for the defendants.

Mr. Grundy said that the dispute arose as a result of a contract for the supply of 400/425 tons zinc oxide which the defendants required to execute an Admiralty contract of their own. It was made on April, 1928, and the price was £29 10s. a ton. Deliveries were made, and in August, 1928, there was a fire at the defendants' factory in Millwall. The plaintiff learned that about 30 tons of his product had been destroyed. His case was that a few days after the fire took place a tacit agreement for him to replace what was destroyed was come to between him and the defendants through Mr. E. A. Stansfield, their managing director. That increased the quantity for delivery to 455 tons.

A Question of Price

In October, 1928, a letter was received from the defendants stating that they had an inquiry for zinc oxide, Admiralty standard, from a new source, and asking for a price lower than that at which the April contract had been placed, in order that a new market could be opened. As a result, continued Mr. Grundy, an alleged contract was entered into in October, 1928, for the sale of 30 tons at £26 15s. By July, 1929, 407 tons of zinc oxide had been delivered, and by the end of that month a further 48 tons was called for and supplied. At this point, the defendants raised a complaint that the plaintiff had invoiced 30 tons wrongly at £29 10s, instead of at £26 15s., and the whole dispute lay in whether the 455 tons was made up of the 425 due under the April 1928 contract, plus the 30 tons which the plaintiff was asked to replace, following the loss of that quantity by fire, in August, 1928, or whether, as the defendants contended, the extra 30 tons was in execution of the alleged contract of October, 1928, at the lower price.

It had come to the plaintiff's knowledge that the whole of the zinc oxide he had supplied had been used by the defendants in fulfilment of their contract with the Admiralty, and none for any new market spoken of by Mr. Stansfield. Mr. Grundy added that Mr. Brown re-purchased about 30 tons of damaged zinc oxide from Messrs. Leopold Lazarus after the fire, they having got it, with other material, from the defendants' factory. He was able to identify it as his own product by the marks on the bags, and by packing slips.

After Mr. James M. Brown, the plaintiff, had given evidence, Mr. Spiers, a clerk to Messrs. Leopold Lazarus, said that out of about 100 tons of material purchased out of the burnt factory, about 30 tons of zinc oxide was sent to Mr. Brown with a request for the best price.

Evidence for the Defence

Mr. Edward Arnold Stansfield, defendants' managing director, the first witness for the defence, referring to the conversation with Mr. Brown after the fire, said that Mr. Brown said he had heard that defendants had lost some zinc oxide and they would probably want it replaced. Witness replied that he did not know how much had gone, and that defendants required no zinc oxide at the moment. It was quite possible, added Mr. Stansfield, that in the process of manufacture the amount due under the April contract, even without the lost quantity, would have been sufficient to execute the contract with the Admiralty, as a margin was always allowed when a contract was placed. He admitted writing the letter of October 25, 1928, asking for a lower price for 30 tons of zinc oxide in order to get new business. After the contract at £26 15s. was made, witness had a conversation with Mr. Brown, who appeared very annoyed. He seemed to have found out that the 30 tons under the October contract was being used for the defendants' Admiralty contract.

Mr. Stansfield, cross-examined, agreed that about 30 tons of zinc oxide was destroyed in the fire, and that some was that supplied by plaintiff. It was not necessary, however, that it should be replaced by Mr. Brown. There were other manufactures.

Mr. Grundy: You could only go to other people with the consent of the Admiralty?—Correct.

Did you in fact get that consent?—It was not necessary.

You wanted the 425 tons?—Yes.

And 30 tons was lost in the fire?—Yes.

Then why don't you pay the £29 10s. if that is the case?—For the simple reason that the price of spelter had fallen, and we got another contract in October, 1928.

The Judge: What new business was it you wanted to secure when you bought the 30 tons in October, 1928.—No business. I did it to get a cheaper price.

Mr. Grundy: Do you know what a fraud is?—This is no such thing as fraud.

Do you call this honourable?—It is business. It is done.

Were you insured for this fire?—Yes.

What did you receive per ton?—£29 15s. The 5s. was included for handling.

And in order to replace the lost zinc oxide you thought to yourself, "Well, I will tell the plaintiff we have got this new business, and get it at a less price."—We did.

That is your story?—Yes.

The Judge: That was untrue, was it?—Yes.

The Judge's View

Giving judgment, His Lordship reviewed the history of the April, 1928 contract, and the October, 1928 contract, and the conversation following the fire in August, 1928. He had come to the conclusion, he said, that in view of what had been said by the witnesses, there was sufficient evidence to justify him in coming to the conclusion that an agreement was made between the parties that the amount of zinc oxide lost in the fire should be replaced by the plaintiff. Nothing was said about price, but he thought the proper inference to draw was that it was to be supplied at the same price as the contract.

"That practically decides the case," went on the Judge, "but there are one or two matters I ought to refer to. Having heard the evidence and the damaging admissions of the defendants' managing director, and that the plaintiff was not seeking this class of business at all except for a particular object, I come to the conclusion that the defendants perpetrated a gross fraud, and induced the plaintiff by fraudulent misrepresentation to enter into a contract he would not have otherwise entered into. It is impossible to hold that this contract is in any way binding on the plaintiff. Nothing can stand against fraud, of which this is one of the grossest examples I have seen for some time."

The Judgment

His Lordship held that all deliveries were made under the contract of April, 1928, and the variation to it of August, 1928, and that plaintiff was entitled to succeed on his claim. Judgment was entered accordingly for the plaintiff for £82 10s., with costs, and an application by Mr. Ricardo for a stay of execution was refused.

Death of Mr. T. D. Buttercase

THE death occurred on Tuesday, at a Bradford nursing home, of Mr. Thomas Douglas Buttercase, of Toller Lane, Bradford, a director of the Bradford Dyers' Association, Ltd., and prominent in the dyeing and finishing industries of the North. He was a native of Fifeshire. Of late years, Mr. Buttercase's activities were principally confined to the administration of the Labour Department of the B.D.A. In that position he was connected with all the negotiations between the dyeing trade employers and the trade unions, and occupied the position of chairman of the wages committee of the Allied Association of Bleachers, Dyers, Printers and Finishers. He was elected to the board of the Bradford Dyers' Association in 1919, having previously been manager of the B.D.A. branch at the Greetland Dyeing Co., Ltd., and chief assistant to Sir Thomas Robinson on the Bradford and Manchester boards. He succeeded Sir Thomas as head of the B.D.A. Labour Department and chairman of the Allied Association. He was appointed a member of the executive committee of the B.D.A. this year. He was also chairman of the Yorkshire Masters Dyers' Committee. He leaves a widow.

Imperial College of Science

Speeches at the Annual Dinner

THE annual dinner of the Imperial College of Science and Technology was held on Monday, December 9, at the Hotel Victoria. In the absence of Lord Buckmaster through indisposition, the Rector of the College (Mr. H. T. Tizard), presided.

Is there Too Much Sport?

Lord Parmoor, in proposing "The College," said that nothing could be more important than to attempt to meet the industrial difficulties in this country by scientific and technological discoveries and research. If that failed, he knew of no other resource in the background. He did not think that the mere building up of knowledge was what was wanted; it was real understanding in order that knowledge might be employed efficiently. He did not wish to run down sport and amusement, but he thought they ought to be kept in a secondary place. He looked with some suspicion at the extraordinary growth of sport in his old university. When he was at Oxford he played in the winning football team in 1874, but he believed the game had gone into professional hands since then. At the Imperial College, sport was subordinated to the greater necessity of learning. They had 1,100 students, 20 per cent. of whom came from countries in the Empire outside of our own country.

The Chairman, responding, said that scientific men as a whole did not display a great interest in politics. They were led to regard the facts of the day as they were and not to bind themselves readily to doctrine. Scientific men were ready to help any Minister of the Crown who was trying to find a way through the difficulties of the present time.

Professor W. W. Watts, in proposing the toast of the guests, drew attention to the fact that the College was living through a difficult period, the new statutes of London University presenting problems which they were loyally trying to solve. The statutes appeared to confirm certain privileges which had already been granted to the students and the examinations of the College, but they seemed to close the door to other ambitious schemes which had occupied the thoughts and labour of several members of the College. He felt that the special position of the College, originated and for many years carried on by the Government as the first experiment in the application of education in science to industry in the country, had not been sufficiently considered. For this reason, it was most gratifying to have present so many leading representatives of the scienitific sides of industry, of research, and of those from whom generous endowment of research and education had come.

Liaison Between Scientist and Industrialist

In reply, Sir William Larke, director of the National Federation of Iron and Steel Manufacturers, reminded them that he was a student under Sylvanus Thompson in an organisation which had since been absorbed by the College. As an industrialist, he frequently heard the complaint of the scientist that industry was slow to apply his discoveries, but this apparent lethargy was frequently more the responsibility of the scientist than the industrialist. It was obvious that, unless the scientist could interpret his discoveries in the language of the industrialist, he could not expect the industrialist to apply discoveries which were unintelligible to him; and if the scientist expected the industrialist to appreciate them in the language of the scientist then the industrialist was himself a scientist and the interpretation would be unnecessary.

Lord Passfield, in his reply, reminded those members of the College whose field of endeavour in the future was British industry, and particularly those whose future was so soon to become their present, that, while the raw materials of industry were themselves inanimate, their most important instruments of production were men, and leadership in industry required that they should bear in mind Pope's injunction "that the proper study of mankind is man." If they were to apply to him for an appointment, he would appraise their qualities and experience as to 70 per cent. knowledge of their fellows and personality, and the balance academic distinction. It was of little service to have knowledge which could not be imparted to others; or the application of which could not be secured owing to lack of sympathy and understanding of those through whom it must be applied.

Mr. E. L. Francis, president of the Imperial College Union proposed "The Chairman," who briefly replied.

Among those present were:—Sir D. Milne Watson, Sir John Russell, Professor Sir Harold Carpenter, Sir Richard Gregory, Sir William and Lady Jarratt, Colonel Sir Henry Lyons, Sir Ernest Moir, Sir Joseph Petavel, Mrs. H. T. Tizard, Professor W. E. Dalby, Dr. W. Cullen, Professor A. Fowler, Professor C. L. Fortescue, Professor J. W. Hinchley, Professor J. C. Philip, Professor W. P. Wynne, Professor H. E. Armstrong, Professor H. B. Baker, Professor W. A. Bone, and others.

Clay Works on Dartmoor

Protests at Conference

THE granting of a licence by the Duchy of Cornwall to Whitehall Securities, Ltd., to work China Clay on Broad Down, Dartmoor, has roused public feeling in Devonshire against the possible turning of the River Dart into a white river and interference with the amenities of Dartmoor. About forty separate organisations were represented at a conference convened by the Dart Board of Conservators to consider the matter at Totnes recently.

Mr. D. M. Waterson, who presided, said that the large assembly showed they were realising that the beauty of Devon must not be tampered with unduly. It was certain that there would be pollution, at any rate temporarily from time to time. A little China Clay would not kill the fish, but the ova, which was more serious. Sir Walter Peacock had promised that if they could prove that the Dart would be spoiled or the amenities of Dartmoor deteriorated, he would not grant the lease. He had promised to put in the most stringent clauses, but could he put them in force? The chairman contended that at present development work was ahead of the requirements, and that the existing pits could produce 50 per cent. more clay.

Sir Walter Peacock's letter to the Board of Conservators was read. He stated that the Duchy was satisfied that with proper safeguards there was no danger of pollution. The Duchy was dealing with a powerful corporation that had the means to construct the necessary works.

The Question of Employment

A lengthy report was submitted to the meeting by Mr. R. Hansford Worth, of Plymouth, stating that he could find no justification for the idea that employment to any extent would be provided. There was no room for clay works producing anything but first-class clay, and any clay on Dartmoor was far from first grade. Dartmoor was now practically as it stood in prehistoric times, and any such works would be destructive.

Alderman W. D. Thomas, of Torquay, chairman of the South Devon Town Planning Committee, representing fourteen public authorities, moved a resolution expressing grave concern at the granting of the exploratory licence, and requesting the Duchy of Cornwall to receive a deputation, so that the views of various interests in South Devon could be placed before them. Mr. Finderson, of the Torquay Chamber of Commerce, seconding, said that they would want reservoirs for South Devon towns on Dartmoor.

The Mayor of Totnes said that they viewed with grave concern the possible discoloration of the Dart and the despoliation of Dartmoor. China Clay working would create more unemployment than employment. Mr. J. E. Morris, of the Commons Preservation Society, said that they should beware of the thin end of the wedge; 500 workers would mean a town of 2,000 people in the heart of wildest Dartmoor, and would ruin its amenities. Mr. H. Michelmore, of Newton Abbot, said that if the deputation to the Duchy failed they would appeal to the syndicate to withdraw from the lease on the ground that it was the most unpopular scheme ever propounded in the county.

The resolution was unanimously carried, and the Mayors of Totnes and Dartmouth, with Alderman Thomas and Alderman Widgery (Exeter) and Messrs. Hansford Worth, Hunter, Joy, and Waterson, were appointed as a deputation.

From Week to Week

AN ARTIFICIAL SILK FACTORY, it is reported, is to be established in Hungary by a British group which has been negotiating with the Hungarian Government.

DR. H. LEVINSTEIN, president of the Society of Chemical Industry, addressed the Newcastle Section at a meeting on Thursday, December 12. Subsequently he presented the Saville Shaw Medal to Mr. T. W. Simpson, to whom it was awarded for work in chemistry and metallurgy.

BRADFORD CORPORATION GAS COMMITTEE have decided to install a water-gas plant at Valley Road works, to augment the supply in case of emergency. The cost of plant and buildings is estimated to be about £18,000; and the plant is expected to produce 2,000,000 cubic feet of gas per day.

MR. EDISON has denied the report that the manufacture of synthetic rubber from the plant known as golden rod is to be exploited commercially. While it was true, he said, that of the thousands of plants with which experiments had been made golden rod had been found to be the most satisfactory, no estimates had yet been made of the possible costs of production, nor had commercial possibilities been decided.

THE AMALGAMATED METAL CORPORATION has appointed the following gentlemen as additional directors: Mr. R. C. Stanley, president of International Nickel Co. of Canada (alternate, Sir George E. Leon); Mr. J. J. Warren, president of Consolidated Mining and Smelting Co. of Canada (alternate, Mr. W. Murray); and Mr. A. M. Baer. Mr. W. S. Robinson, one of the first directors, has appointed Mr. Clive L. Baillieu as his alternate.

MR. PHILLIP WITHINGTON COOKE, of Sparkbrook, a research student, received judgment at the Birmingham Assizes last week for £1,300 damages and £150 costs (which amounts were agreed to) against Bryant and Sons, Ltd., of Small Heath, for personal injuries. Mr. Cooke was badly injured in a collision, and his right leg had to be amputated. He had been unable to continue his studies at Birmingham University for the B.Sc. Degree.

THE PARLIAMENTARY COMMITTEE on Food and Health, which fell into abeyance during the war period, was revived at a meeting attended by several M.P.'s in the House of Commons on Thursday, December 12. Sir Robert Newman, M.P., was appointed chairman, Mr. Tom Groves, M.P., secretary, and Mr. C. E. Hecht assistant secretary. One of the chief objects of the committee is to keep a close watch on matters relating to food and public health. Before the war it took a leading part in the agitation for inquiry into the sale of patent medicines. An executive, representative of all parties in the House, was appointed.

THE JOINT ADVISORY COMMITTEE on River Pollution, meeting in London on Monday and Tuesday at the Ministry of Health, considered the question of the access of trade and manufacturing waste liquids to the sewers of local authorities. Evidence was taken by the committee from the Association of Municipal Corporations, the Federation of British Industries, the Calico Printers' Association and the Bleachers' Association. Memoranda were submitted by the National Oil Refineries, Ltd., Mr. W. J. Steele, the City Engineer of Newcastle, and Mr. J. H. Anderson, Clerk to the Trowbridge Urban District Council.

LORD MELCHETT, speaking at a luncheon of the Bribery and Secret Commissions Prevention League, in London, on Wednesday, said that he remembered the time when it was impossible to sell chemicals in many directions without offering some kind of present or consideration to those who were using them. "I remember one competitive firm," he said, "that has long ceased to exist, that used to distribute Cheshire cheeses, Christmas geese, and cigars to the managers and foremen with the idea of obtaining orders. Of course, with the great organisations that exist to-day, all that kind of thing has died down and ceased to exist, but there is still a great deal of room for our work in many directions." Lord Melchett suggested that a black list of firms who gave and offered bribes, published from time to time, would help in the suppression of the practice.

ADDRESSING the Nottingham Service Club at the Elite Theatre, Nottingham, on Wednesday, December 11, Mr. F. E. Hamer (THE CHEMICAL AGE) claimed that as the public man was a better informed public man and the citizen a better citizen for the study of his national or provincial daily journal, so every trader should be a better trader for the study of the journal or journals that each week recorded the movements within his own industry. It meant in every case a higher standard of trade intelligence and a keener personal trade interest. Whether they took a great national daily, an obscure country weekly, a dry technical or scientific production, or a trade journal that had become the "Bible" of its trade, the journalistic function was always fundamentally the same. It was the collection and distribution of news; a general or, it may be, a highly specialised intelligence department, worked by experts long trained in the art of selecting relative facts and presenting them in the most convenient form.

RECENT WILLS INCLUDE:—Mr. Abraham Kershaw, of Scarborough, director of A. Kershaw and Son, scientific instrument manufacturers, of Leeds (net personalty, £49,450), £51,197.

CAPTAIN ARTHUR PARRY ANDERSON has joined the board of the New G. and S. Processes Syndicate, which is developing special processes for the manufacture of varnish, artificial silk, and safety glass specialities.

THE I.G. is believed to be considering the extension of the Leuna works. The extensions are thought to bear more on the question of synthetic petrol production than on the production of nitrogen products.

MR. L. H. SENSICLE, the chief chemist of the Newcastle and Gateshead Gas Co., has been appointed to a similar position with Gas Chambers and Coke Ovens, Ltd., in London, and will take up his duties after the New Year.

THE BOARD OF CHEMICAL AND WOOD INDUSTRIES, LTD., has been reorganised following on a change of control. The following directors have resigned:—Viscount Elibank, Sir James Calder, Major C. F. Entwistle, and M. René Paul Duchemin.

THE PRINCE OF WALES has expressed his willingness to become patron of the British Empire Trade Exhibition, which will be held in Buenos Aires from February 18 to April 2, 1931, and his confidence that the exhibition will be of great benefit to British trade.

THE NORTHERN CHROMIUM CO., LTD., has established works at Skinnerburn Road, Newcastle. The works, which will carry on chromium plating by the process developed by Dr. Nast, were officially opened on Wednesday by Sir Andrew Duncan, chairman of the Government Electricity Board.

DR. W. R. ORMANDY addressed a largely attended meeting of the Chemical Industry Club on Monday on "Holiday Experiences on Land and Water." Mr. J. F. Ronca, chairman of the committee, presided, and the address was followed by an interesting discussion and a cordial vote of thanks.

MR. COLIN MCLUCKIE, of the Wigan Mining College, has invented an instrument, known as the McLuckie Gas Detector, for the detection and measurement of combustible gases in air, for use in coal mines and other places where dangers arise from the presence of noxious gases. It is now undergoing tests at various collieries.

MR. W. R. D. PERKINS has been recommended by the executive committee of the Stroud Division Conservative Association as prospective candidate to succeed Sir Frank Nelson, who is not expected to seek re-election. Twenty-six years of age, he is an M.A. of Cambridge, an engineer by profession, and a director of Roy Demster, Manchester, and of the Longloan Iron and Chemical Co., Coatbridge, and of E. Cookey and Sons, Frome.

THE FUSION is announced of the Eastern Smelting Co., Williams, Harvey and Co., Cornish Tin Smelting, and the Penpoll Tin Smelting. A scheme has been prepared for the formation of a holding company which will acquire by exchange the shares of the constituent companies. The new company will have an authorised capital of £5,000,000 in £1 shares, 2,000,000 each ordinary and 7 per cent. non-cumulative preference and 1,000,000 for future issue.

FIFTY BRITISH PAPERS will be presented at the Second World Power Conference, to be held in Berlin in 1930. These are sponsored by such leading bodies as the Central Electricity Board, the British Electrical and Allied Manufacturing Association, the Institution of Electrical Engineers, the Institution of Mining Engineers, the Institute of Fuel, the Society of British Gas Industries, the Society of Chemical Industry and others. The list of authors from whom contributions have been received includes such prominent men as Dr. Rudolf Lessing, Mr. E. C. Evans, Dr. C. H. Lander, Mr. C. W. Marshall (Central Electricity Board), Sir Charles Parsons, and many others. The whole of the preliminary work which is being done in Great Britain in preparation for the Second World Power Conference is being supervised by Mr. D. N. Dunlop, the chairman of the International Executive Committee of the World Power Conference.

Obituary

DR. CARL BRENDEL, director of the technical chemical section of the German Institute for the Sugar Industry, on December 1, aged 60.

DR. FRITZ BLAU, of the electrical illuminating section of the Osram G.m.b.H., Berlin, on December 5, aged 64.

MR. DAVID R. S. DOCHERTY, chemical broker, of Glasgow, suddenly in a London nursing home on December 14.

DR. F. W. DOOTSON, lecturer and demonstrator in chemistry in the University of Cambridge, on December 12.

MR. FRANCIS A. J. FITZGERALD, head of the Fitzgerald Laboratories, Niagara Falls, and president in 1916 of the American Electro-Chemical Society, on October 26, aged 59 years.

MR. RICHARD TILDEN SMITH, a director of the National Metal and Chemical Bank, Ltd., on Tuesday. He was lunching in the House of Commons, when he suddenly collapsed and died. He was the principal proprietor of the Tilmanstone (Kent) Collieries.

References to Current Literature

British

OILS.—The head and blubber oils of the sperm whale. II.—Investigation of some of the component wax esters and the general structure of the oils. III.—Quantitative determinations of the higher fatty alcohols present. T. P. Hilditch and J. A. Lovern. *J.S.C.I.*, December 13, pp. 359–365T, 365–368T.

ORGANIC.—Recent advances in the chemistry of aldehydes. G. M. Dyson. *Perfumery and Essential Oil Record*, November 19, pp. 435–439.

STEROLS.—The structure of surface films. XIII.—Sterols and their derivatives. N. K. Adam and O. Rosenheim. *Proc. Roy. Soc. A*, December 2, pp. 25–34.

Monomolecular films of irradiated ergosterol in relation to the production of vitamin D. O. Rosenheim and N. K. Adam. *Proc. Roy. Soc. B*, November 1, pp. 422–428.

TEXTILES.—The application of the locust bean in the textile industry, and especially in calico printing. G. Tagliani. *Journ. Soc. Dyers and Colourists*, December, pp. 344–349.

United States

COAL.—Benzene-pressure extraction of coal. J. D. Davis and D. A. Reynolds. *Ind. Eng. Chem.*, December, pp. 1295–1298.

CHEMICAL ENGINEERING.—Line coordinate charts for representing chemical engineering data. E. A. Ravenscroft. *Ind. Eng. Chem.*, December, pp. 1203–1210.

Locating an obstruction in a clogged line of the compressor. J. Rathbun. *Ind. Eng. Chem.*, December, pp. 1257–1258.

Lubrication of gas mains by means of an oil fog. O. H. Blackwood and P. G. Exline. *Ind. Eng. Chem.*, December, pp. 1258–1260. A persistent oil fog, suitable for internal lubrication of gas mains, is composed of particles one micron in diameter, or smaller. Such a fog may be produced by condensation or by atomisation with compressed gas. The condensation method produces large quantities of fine fog, but is rather difficult of control. Atomisation offers a simple method, but the quantity of fine particles formed is limited.

FERMENTATION.—Fermentation products of cellulose. C. S. Boruff with A. M. Buswell. *Ind. Eng. Chem.*, December, pp. 1181–1182.

Some unusual alcoholic fermentations. J. R. Eoff, H. Buttler and W. Melchior. *Ind. Eng. Chem.*, December, pp. 1277–1279.

Semi-plant scale production of gluconic acid by mould fermentation. O. E. May, H. T. Herrick, A. J. Moyer and R. Hellbach. *Ind. Eng. Chem.*, December, pp. 1198–1203.

GENERAL.—Mothproofing. H. G. Minaeff and J. H. Wright. *Ind. Eng. Chem.*, December, pp. 1187–1195. The process of mothproofing with formulæ based on silicofluorides is described and the results demonstrated. It has ben shown that wool possesses a great affinity to silicofluorides, and therefore they can be applied from dilute solutions. Owing to these properties, mothproofing with silicofluoride formulas is said to be much more effective and durable than with sodium fluoride formulas.

Fermentation with formaldehyde. D. W. Horn and A. Osol. *American Journ. Pharmacy*, November, pp. 741–778.

OILS.—A proposed thiosulphate number for olive oil. W. H. Dickhart. *American Journ. Pharmacy*, December, pp. 781–784.

ORGANIC.—1-Amino-2:4-dichloroanthraquinone. I. Gubelmann, H. J. Weiland and O. Stallmann. *Ind. Eng. Chem.*, December, pp. 1231–1232. The preparation of 1-amino-2:4-dichloroanthraquinone here described is an illustration of the preparation of an anthraquinone body through a benzoylbenzoic acid synthesis, after many attempts to prepare it directly from aminoanthraquinone had failed.

German

ADSORPTION.—The slow adsorption of acetic acid, benzoic acid and Crystal Violet from aqueous solutions by charcoal. W. Krestinskaja. *Kolloid-Zeitschrift*, December, pp. 395–406.

AMMONIA SYNTHESIS.—The historical development and the theory of ammonia catalysis. A. Mittasch and W. Frankenburger. *Zeitschrift Elektrochem.*, December, pp. 920–935.

ANALYSIS.—The determination and separation of zirconium and beryllium. O. Ruff and E. Stephan. *Zeitschrift anorganische Chem.*, Vol. 185, Parts 1–2, pp. 217–220.

The determination of nicotine in viscera. B. Kraft and G. Steinhoff. *Archiv Pharmazie*, November, pp. 609–616.

The detection of saponines in drugs and foods. L. Kofler, R. Fischer and H. Newesely. *Archiv Pharmazie*, December, pp. 685–699.

APPARATUS.—The construction of electric resistance ovens. E. Schwarz-Bergkampf. *Chemische Fabrik*, December 11, pp. 519–520.

A simple volume-measuring instrument, and its application to the determination of porosity and of the true and apparent specific gravity of porous masses. R. Wasmuht. *Chemische Fabrik*, December 11, pp. 520–522.

New glass filtering apparatus. P. H. Prausnitz. *Chemiker-Zeitung*, December 4, pp. 935–936; December 11, pp. 955–956.

GENERAL.—The compressibility of ethylene. H. Danneel and H. Stoltzenburg. *Zeitschrift angewandte Chem.*, December 7, pp. 1121–1123.

Solubility of manganese dioxide under the influence of metallic mercury. J. Meyer and R. Kauters. *Zeitschrift anorganische Chem.*, Vol. 185, Parts 1–2, pp. 172–176. Neither manganese dioxide nor mercury dissolves in cold dilute sulphuric or nitric acid, but both together dissolve easily according to a coupled reaction: $MnO_2+2Hg+HNO_3=Mn(NO_3)_2+2HNO_3+2H_2O$ (and similarly for sulphuric acid).

Synthetic studies of the relation between chemical constitution and action on micro-organisms. VIII.—The glucosides of simple and chlorinated parahydroxybenzoic acid and its esters. T. Sabalitschka with F. L. Schweitzer. *Archiv Pharmazie*, December, pp. 675–685.

Potassium chloride in fibrous form. A. Kutzelnigg. *Kolloid-Zeitschrift*, December, pp. 439–441.

Iodine as a biological element. C. Oppenheimer. *Chemiker-Zeitung*, November 30, pp. 925–927; December 14, pp. 968–969.

The hydrates of chloride of lime. B. Newmann and H. Haebler. *Zeitschrift Elektrochem.*, December, pp. 909–914.

ORGANIC.—Note on the behaviour of monohydric alcohols towards ferrous sulphate and hydrogen peroxide. L. Rosenthaler. *Archiv Pharmazie*, November, pp. 599–601. In contradistinction to the work of Fenton and Jackson, it is found that the monohydric alcohols, from methyl to amyl, are oxidised by ferrous sulphate and hydrogen peroxide.

The synthesis of 1-phenyl-2-methyl-3:4-cyclotrimethylenepyrazolone-5. C. Mannich. *Archiv Pharmazie*, December, pp. 699–702.

Polynuclear aromatic hydrocarbons and their derivatives. V.—Naphthoanthracene, its oxidation products and a new class of deeply-coloured hydrocarbons. E. Clar and F. John. *Berichte*, December 4, pp. 3021–3029.

2:3-Dimethylnaphthalene in coal tar. O. Kruber. *Berichte*, December 4, pp. 3044–3048.

PHASE RULE.—The reciprocal salt pair $MgSO_4$—$Na_2(NO_3)_2$—H_2O. V.—W. Schröder. *Zeitschrift anorganische Chem.*, Vol. 185, Part 1–2, pp. 153–166.

REFRACTORIES.—Contribution to the ceramics of highly refractory substances. IV.—The system ZrO_2—BeO. O. Ruff, F. Ebert and E. Stephan. *Zeitschrift anorganische Chem.*, Vol. 185, Parts 1–2, pp. 221–224.

VITAMINES.—The vitamin-D content of the fats of various fish. S. N. Matzko. *Biochemische Zeitschrift*, Vol. 215, Parts 4–6, pp. 381–386.

WOOD.—The utilisation of low-grade woods and waste wood. C. G. Schwalbe. *Zeitschrift angewandte Chem.*, December 7, pp. 1118–1121.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

320,424. PRIMARY ALCOHOLS, MANUFACTURE OF. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 17, 1928.

Primary alcohols are obtained by treating an alkylene oxide containing the group $R^1—CR—CH_2$ (where R is a hydrogen, with O bridging the CR and CH_2), with hydrogen in the presence of a hydrogenation catalyst, more particularly finely divided metals of the 8th group, such as nickel, cobalt, iron, platinum, palladium, etc., which may be precipitated on an inert carrier such as pumice, calcium carbonate, silica gel, charcoal, etc. These catalysts may be mixed with a promoter such as aluminium oxide, thorium dioxide, ceria, chromium oxide, silica, zirconia, molybdenum oxide, or vanadium oxide. An example is given of the preparation of a nickel catalyst and its use in the treatment of propylene oxide at 170° C. with hydrogen to obtain N-propyl alcohol. Examples are also given of the treatment of a mixture of α and β butylene oxide to obtain butyl alcohols, and the treatment of styrene oxide to obtain β-phenylethyl alcohol.

320,457. ORGANIC ACIDS AND ESTERS, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 16, 1928.

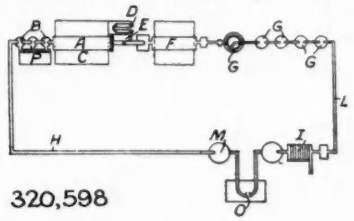
Organic acids and esters are obtained in high yield by treating vaporised aliphatic alcohols, *e.g.*, methanol or ethyl alcohol, with gases containing carbon monoxide in the presence of acid catalysts which do not shrink, sinter, or crumble under the conditions of working, and containing a difficultly reducible oxide of a metal and less than twice the stoichiometrical amount of an inorganic acid which can be titrated with a caustic alkali solution. Acids of boron, phosphorus, and arsenic, and complex acids of these with molybdenum or tungsten are suitable. The difficultly reducible oxides employed are those which are not reduced by hydrogen below 500° C. Oxides of calcium, barium, zinc, cadmium, chromium, aluminium, cerium, lanthanum, manganese, etc., may be used. Thus, suitable catalysts may consist of chromium metaphosphate, cerium metaphosphate, or mixtures of these with metaphosphates of the other metals. Also, zinc arsenite, cerium phospho-tungstate, or phospho-tungstate or phospho-molybdates of the other oxides may be used. The formation of higher alcohols or acids is avoided, and nearly pure acids and esters are obtained. Examples are given.

320,473. HYDROCARBONS OF LOW BOILING POINT, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application dates, August 31 and November 22, 1928.

Destructive hydrogenation of coal, tar, mineral oils, etc., is effected in several stages. Those constituents which are not affected by the first treatment are separated and then treated at a higher temperature. Further stages and still higher temperatures may be employed, and in the final stage the material is employed in the form of vapour. Other chemical or physical treatment may be employed between the separate stages, and catalysts, particularly those of the 6th group, may be employed. Examples are given of the treatment of American crude oil to obtain benzene, and coal to obtain benzene and other oils.

320,598. PHOSPHORUS AND HYDROGEN. H. Wade, London. From Soc. Italiana per le Industrie Minerarie e Chimiche, 26, Piazza Fontane Marose, Genoa, Italy. Application date, April 13, 1928.

Phosphates are treated with hydrochloric acid in equivalent amount to that of the phosphoric acid, and then reduced by means of finely divided iron, aluminium, or other metal, in the presence of silicic acid, at a temperature between dull red heat and 700° C. The reducing metal is obtained by reducing the oxide by means of hydrocarbons, and the process may be carried out in cast iron or steel vessels. The reaction is effected in a retort A, heated by a furnace C, and the phosphorus is condensed in a water-cooled condenser B and collected in a tank P. Coal is incompletely burnt in a retort D,



320,598

and the mixture of carbon monoxide and nitrogen obtained is used to displace the air and phosphorus vapour from the retort A at the beginning and end of the process. The hydrogen obtained in the reaction passes to a gasholder M, and thence to a chamber O where it is combined with chlorine to obtain the hydrochloric acid for use in the process. The chlorine may be obtained by electrolysis of sodium chloride in the apparatus I. The metal powder is reduced in the retort F, and the light hydrocarbons also obtained are condensed in apparatus G. The combustible gases obtained are used for generating power in the process.

320,606. ACETIC AND OTHER ALIPHATIC ACIDS. British Celanese, Ltd., 22, Hanover Square, London, and J. Billing, of British Celanese, Ltd., Spondon, near Derby. Application date, July 11, 1928.

Aqueous solutions of acetic and other aliphatic acids are treated with solvents for the acids in two or more stages, so that the ratio of acid to water in the extract is greater at each stage than in the preceding stage. In the case of acetic acid, the first treatment may be with ether, ethyl acetate, ether containing 20–30 per cent. of petroleum ether, or ether or ethyl acetate mixed with methylene chloride or carbon tetrachloride. The extract is distilled, and the acid treated with another solvent such as petroleum ether, benzene, a mixture of ether and 30–50 per cent. of petroleum ether or chlorinated hydrocarbons such as methylene chloride, ethylidene chloride, trichlor-ethylene or carbon tetrachloride, with or without ether or ethyl acetate. In the last stage, the solvent forms an azeotropic mixture with the water so that the water can be distilled off with the solvent. The extraction can be effected by mixture, or by counter-current in a column, or by passing the vaporised solvent into an extraction column. Thus, acetic acid of 15–30 per cent. strength is extracted with ether, and the extract is distilled to obtain 70 per cent. acid. This acid is extracted with methylene chloride, yielding an acid of 97–98 per cent. strength, and a liquor of 30 per cent. strength which is treated again.

320,619. CRACKING HYDROCARBONS. R. E. Goldsbrough and H. Tevis, 170, Piccadilly, London. Application date, July 13, 1928.

Finely divided oil, coal, or other fuel, is injected with superheated steam at 850°–940° C. into a chamber lined with silica, sodium silicate, alumina, and zinc oxide, with or without magnesite and lime. The vapours pass through a conduit lined with a catalyst, at decreasing temperatures, and are condensed suddenly out of contact with the catalyst. The products contain a large proportion of liquid hydrocarbons suitable for motor spirit. The catalyst preferably consists of silica 14 parts, sodium silicate 9 parts, alumina 4 parts, zinc oxide 2 parts, and traces of magnesite and lime.

320,638. PHENOLS AND CYCLOHEXANOLS. W. P. Williams, London. From Schering Kahlbaum Akt.-Ges., 170, Müllerstrasse, Berlin. Application date, July 17, 1928.

A dioxy-diphenyl methane is treated with hydrogen either at a temperature above the decomposition point in the presence of a hydrogenation catalyst, or at a temperature below the

decomposition point with the further addition of a porous catalyst. Alkylene phenols are produced by the thermal decomposition, and are simultaneously hydrogenated to the corresponding alkyl phenols or cyclohexanols. If the hydrogenation is not completed, some cyclohexanones may be formed. The porous catalyst is added in the proportion of 0·5–1 per cent. to the hydrogenation catalyst, and may consist of fuller's earth, diatomite, silica gel, tonsil, or "Frankonite." In an example, 4 : 4^1–dioxydiphenyl-dimethyl-methane is heated with hydrogen under pressure to 250°–280° C. in the presence of nickel, or to 170°–180° C in the presence of nickel and tonsil. The products are *p*-isopropylphenol and phenol, or by continuing the treatment a mixture of 4-isopropylcyclohexanol, cyclohexanol, 4-isopropyl-cyclohexanone and cyclohexanone. Other examples are given of the production of thymol and *m*-cresol, or with further treatment a mixture of stereo-isomeric menthols and menthones, with 3-methylcyclohexanol and 3-methylcyclohexanone. Also the production of *p*-ethylphenol and phenol; and a mixture of 4-methylcyclohexanol and cyclohexanol.

320,641. Dye Intermediates. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 17, 1928.

A carbazol sulphonic acid, having at least one free 1 or 8 position, is mononitrated and the resulting 1 or 8-nitro-carbazol sulphonic acid is reduced and the sulphonic groups split ffo by heating under pressure, if desired after replacing the amino group by a substituted amino group by normal reactions. The products are 1-amino-and substituted aminocarbazols. In an example, carbazol is sulphonated with oleum at 100° C., and the resulting carbazol 3 : 6 : 8—trisulphonic acid is mono-nitrated and the product reduced with iron and acetic acid to obtain 1-amino-carbazol-3 : 6 : 8-trisulphonic acid. This may be heated under pressure with dilute sulphuric acid to remove the three sulphonic groups.

320,699. Vulcanising Indiarubber. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 26, 1928.

Rubber is vulcanised with an addition of an organic derivative of ammonia in which at least one hydrogen atom of the ammonia is substituted by an olefinic radicle. The other hydrogen atoms may be substituted by the same radicle or by an alkyl or aryl radicle. Substances mentioned include butenyl-piperidine, methyl-dibutenyl-amine, methyl-butenyl-amine, the reaction product of mercapto-benzothiazole and butenyl-piperidine, butenyl-dicyclo-hexylamine, thioglycollic N-*n*-amylenyl-piperidine, thiocarbonic methyl diamylenyl-amine, and the reaction product of vinyl acetate and ammonia.

320,708. Fertilizers, Manufacture of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 7, 1928.

Finely divided calcium carbonate is added to a hot concentrated solution or melt of ammonium nitrate, and the mixture solidified by spraying, or by bringing the mass on to cooled rollers. The product may be crushed, screened, and treated with air at 80°–100° C. in a rotary tube furnace. The product contains ammonium nitrate and calcium nitrate.

320,719. Colloidal Iodine. J. Cofman-Nicoresti, 18, Lord Roberts Avenue, Leigh-on-Sea. Application date, August 24, 1928.

Iodine is dissolved in hydrocarbon oil or oleic acid, and converted into the colloidal state by adding an alcohol. The product is gelatinised by adding a fatty acid or salt, or agar-agar, gelatin, pectin, gums, resins, tallow, copra oil, etc.

320,742. Dyes. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester, and A. J. Hailwood, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, September 26, 1928. Addition to 280,647.

Dyestuffs are first obtained by alkaline fusion of naphthalimide or an oxime of acenaphthene-quinone and are then converted into a soluble or colloidally soluble form suitable for vatting by heating with oleum or chlorsulphonic acid, and re-precipitating by dilution with water. The resulting pastes are made slightly alkaline with caustic soda.

320,733. Calcium Cyanide. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 15, 1928.

Calcium cyanide is obtained by passing hydrocyanic acid gas mixed with nitrogen over calcium oxide or hydroxide. The water formed in the reaction is carried away as vapour by the nitrogen.

320,749. Synthetic Drugs. A. Boehringer, Nieder-Ingelheim-on-Rhine, Germany, and C. Schopf, 2, Sophienstrasse, Munich, Germany. Application date, October 6, 1928.

Dihydro-codeinone is treated with an acetylating agent, *e.g.*, acetic anhydride, in excess, to obtain the mono-acetyl derivative, which has therapeutic properties.

Note.—Abstracts of the following specifications, which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—294,958 (Koku-Kenkyujo), relating to reducing the inflammability of hydrogen, see Vol. XIX, p. 323; 295,594 (Soc. of Chemical Industry in Basle), relating to dyestuffs containing chromium, see Vol. XIX, p. 369; 295,694 (I.G. Farbenindustrie Akt.-Ges.), relating to arylcarboxylic acid amide ortho-thioglycollic acids and hydroxy-thionaphthenes, see Vol. XIX, p. 399; 295,716 (E. I. Du Pont de Nemours and Co.), relating to leuco compounds of vat dyestuffs, see Vol. XIX, p. 399; 296,984 (I.G. Farbenindustrie Akt.-Ges.), relating to non-knocking fuels of the benzene type, obtained by destructive hydrogenation, see Vol. XIX, p. 466; 299,048 (I.G. Farbenindustrie Akt.-Ges.), relating to obtaining acetone from acetylene, see Vol. XIX, p. 591; 299,445 (I.G. Farbenindustrie Akt.-Ges.), relating to alkali iodates, and their application to the manufacture of oxygen, see Vol. XIX, p. 640; 299,791 (Soc. of Chemical Industry in Basle), relating to azo dyestuffs, see Vol. XX, p. 13; 300,919 (Soc. de Produits Chimiques de Terres Rares), relating to ammonium and potassium phosphates, see Vol. XX, p. 82; 302,142 (Goodyear Tire and Rubber Co.), relating to a vulcanization accelerator, see Vol. XX, p. 159; 304,118 (A. Wacker Ges. für Elektro-Chemische Industrie Ges.), relating to ketonic acid esters, see Vol. XX, p. 283; 310,507 (W. Friederich), relating to nitrous oxide, see Vol. XX, p. 620.

International Specifications not yet Accepted

319,746. Base-exchanging Silicates. Permutit Co., 440, 4th Avenue, New York. (Assignees of W. M. Bruce, 143, East 39th Street, New York.) International Convention date, September 27, 1928.

Solutions of sodium silicate and aluminium sulphate or chloride are mixed, and a solution of sodium aluminate then added to obtain base-exchanging silicates. The product is pressed and dried. The aluminium salt may be replaced by iron chloride or sulphate, or an acid-reacting solution of a salt of other amphoteric metal oxide. The ratio of sodium oxide to alumina is 1 : 1, but that of alumina to silica may vary from 1 : 1 to 1 : 13—*e.g.*, 1 : 5.

319,747. Vanillin. H. Pauly and K. Feuerstein, 10, Bismarck-strasse, Würzburg, Germany. International Convention date, September 27, 1928.

Vanillin is obtained by the oxidation of lignins—*e.g.*, mosses, grasses, straw, esparto, hemp, flax, jute, ramie, wood, peat, lignite, brown coal, and lyes containing lignins. The oxidation may be effected in acetic acid by a limited amount of ozone, or by chromic acid in acetic acid. The crude vanillin is extracted, and the mass hydrolysed with acid to obtain a second yield of vanillin.

319,762. Anthracene. Rütgerswerke Akt.-Ges., and L. Kahl, 43, Hardenbergerstrasse, Charlottenburg, Berlin. International Convention date, September 29, 1928.

Crude anthracene is dissolved in pyridine, quinoline, or the mixture of organic bases obtained from coal tar. The hot solution is treated with equimolecular quantities or more, calculated on the carbazole, of caustic potash, and pure anthracene is obtained by cooling the solution and filtering. Part of the bases may be replaced by other solvents for the impurities, such as benzene.

Specifications Accepted with Date of Application

294,661. Synthetic rubber, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 28, 1927. Addition to 283,840.

295,944. Dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. August 19, 1927. Addition to 289,094.

296,310. Dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. August 27, 1927.

296,730. White titanic acid, Manufacture of. I.G. Farbenindustrie Akt.-Ges. September 6, 1927.

297,114. Removing sulphuretted hydrogen from gases, Process for. Kali-Industrie Akt.-Ges., C. T. Thorssel, and A. Kristensson. Sept. 16, 1927.

298,190. Nitrogen and hydrogen, Production of. Kali-Industrie Akt.-Ges., and C. T. Thorssel. October 5, 1927. Addition to 288,154.

300,579. Carbon disulphide, Production of. I.G. Farbenindustrie Akt.-Ges. November 15, 1927.

302,143. Accelerator of vulcanisation of rubber. Goodyear Tire and Rubber Co. Dec. 10, 1927.

308,210. Concentrated acetic acid, Method of obtaining. Consortium für Elektrochemische Industrie Ges. March 19, 1928.

322,184. Vat dyestuffs of the anthraquinone series and intermediate products therefor, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) July 23, 1928.

322,189. Iron chromium alloys, Manufacture of. H. G. Flodin. August 28, 1928.

322,209. Azine derivatives, Manufacture and production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 27, 1928.

322,216-7. Alloys. P. W. Digby. August 30, 1928.

322,253. 2-Alkylbenzanthrones, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). September 7, 1928.

322,277. Blue dyestuffs of the anthracene series which contain halogen, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) October 5, 1928.

322,281. Vat dyestuffs of the N-dihydro-1 : 2 : 2^1 : 1^1-anthraquinoneazine series, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) October 10, 1928.

322,284. Unsaturated hydrocarbons of low boiling point, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) October 11, 1928.

322,424. Granular mixed fertilisers containing ammonium nitrate, Manufacture of—and apparatus therefor. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 21, 1928.

304,298. Azo dyestuffs and chromed derivatives thereof, Manufacture of. Compagnie National de Matières Colorantes et Manufactures de Produits Chimiques du Nord Réunies Etablissements Kuhlmann. January 19, 1928.

322,118. Electrolytic removal of metal from metallic bodies, Process and apparatus for. S. O. Cowper-Coles. June 5, 1928.

322,169. Colouring matters, Manufacture and use of. A. G. Dandridge, H. A. E. Drescher, J. Thomas, and Scottish Dyes, Ltd. May 16, 1928.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

A.C.N.A. Aziende Chimiche Nazionali Associate, Belloni and Colli and Percival, S. Manufacture of vat dyestuffs. 37,852. December 10.

Armit, J. W., and Imperial Chemical Industries, Ltd. Purification of methanol, etc. 38,288. December 13.

—— Purification of alcohols. 38,289. December 13.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Disinfection and destruction of insect pests. 37,877. December 10.

Cassella and Co., Ges. L. Manufacture of vat dyestuffs. 37,777. December 9. (Germany, December 10, 1928.)

Clark, A. M., and Imperial Chemical Industries, Ltd. Production of phosphate and nitrate of ammonia. 38,003. December 11.

Clark, L. M., Clifford, I. L., Imperial Chemical Industries, Ltd., and Spittle, H. M. Manufacture of sodium sulphide. 37,656. December 9.

Coley, H. E. Manufacture of zinc. 37,705. December 9.

—— Manufacture of tin. 37,706. December 9.

Elkington, H. D., and Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Manufacture of ammonium sulphate or bisulphate. 38,247. December 13.

Fairweather, D. A. W., Scottish Dyes, Ltd., and Thomas, J. Dyes, etc. 37,763. December 9.

Frischer, H. Apparatus for treatment of acids, etc. 37,935. December 10. (Germany, December 13, 1928.)

Gordon, K., and Imperial Chemical Industries, Ltd. Destructive hydrogenation. 38,328. December 14.

Heide, H. C., and Tschudin, E. Production of nitro-cellulose. 38,363. December 14.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of dyestuffs. 38,135. December 12.

—— Manufacture of unsaturated ethers. 38,136. December 12.

—— Manufacture of vat dyestuffs containing halogen. 38,268. December 13.

I.G. Farbenindustrie Akt.-Ges. Apparatus for carrying out distillations. 37,739. December 9. (Germany, December 12, 1928.)

—— Apparatus for carrying out endothermic catalytic gas reactions. 37,740. December 9. (Germany, December 15, 1928.)

—— Sizing textile fibres. 37,868. December 10. (Germany, December 24, 1928.)

—— Photographic film packs. 37,870. December 10. (Germany, December 10, 1928.)

—— Manufacture of polyvinyl ester colour lakes fast to light, etc. 38,047. December 11. (Germany, December 11, 1928.)

—— Refining magnesium, and alloys thereof. 38,227. December 13. (Germany, January 2.)

—— Taking and copying photographic pictures rich in contrasts. 38,266. December 13. (Germany, December 21, 1928.)

—— Manufacture of heat-insulating masses. 38,267. December 13. (Germany, March 11.)

—— Manufacture of granular active carbon. 38,300. December 13. (Germany, December 13, 1928.)

—— Manufacture of concentrated caustic alkali lyes. 38,392. December 14. (Germany, December 15, 1928.)

Imperial Chemical Industries, Ltd. Purification of synthetic alcohols. 37,858. December 10.

—— Heat exchange between viscous fluids. 37,859. December 10.

Imperial Chemical Industries, Ltd., and Smyth, E. Ammonia oxidation. 38,001. December 11.

Imperial Chemical Industries, Ltd., Piggott, H. A., and Rodd, E. H. Manufacture of dyestuffs from heterocyclic compounds. 38,002. December 11.

Imperial Chemical Industries, Ltd., and Strong, H. W. Destructive hydrogenation. 38,157. December 12.

Imperial Chemical Industries, Ltd., and Spittle, H. M. Production of sulphur. 38,240. December 13.

Imperial Chemical Industries, Ltd. Purification of alcohols. 38,289. December 13.

Linstead, R. P., Thorpe, J. F., and Thomas, J. Production of coloured products. 38,287. December 13.

Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 37,730. December 9. (Switzerland, December 8, 1928.)

—— Manufacture of dyestuffs. 38,046. December 11. (Germany, December 11, 1928.)

Thomas, J., and Wilson, J. S. Production of suspensions, etc., of colouring matter. 37,764. December 9.

Affairs of Cement and Limestone Company

UNDER the winding-up order made against Portland Cement and Limestone Products, Ltd., the statutory first meetings of the creditors and shareholders were held on Friday, December 13, at London Bankruptcy Court. The winding-up order was made on November 18, 1929, on the petition of J. Dawson Fawcett (Darlington), Ltd., creditors for £1,718. The Official Receiver reported that the company was formed in December, 1927, with a nominal capital of £500,000. The issued capital was £131,295. The response to the issue of the shares was not a success, and the result was that the sub-underwriters made default. The net result of a receiver's endeavour was that, after paying off the debenture holder, he had handed over to the Official Receiver £550. The cause of the failure would appear to be insufficient working capital, owing to the action of the underwriters. The statement of affairs filed as from the date of the winding-up showed assets estimated at £3,553, and the liabilities £47,313, with a possibility, so far as the assets are concerned, of obtaining a further £2,000, which the receiver had in hand. A liquidator was nominated to liquidate the affairs of the company.

Chemical Merchant's Affairs

THE affairs of D. and J. Misell, chemical merchants, of 10, Rangoon Street, London, E.C., were mentioned in the London Bankruptcy Court on Friday of last week before Mr. Registrar Mellor on the adjourned hearing of an application for discharge by the debtor David Misell. The failure occurred on December 7 of last year, and particulars of the firm's liabilities and assets have recently appeared in these columns (December 7, p. 528). The application had stood adjourned with a view to the debtor David Misell consenting to judgment in a small sum as a condition of receiving his discharge. His Honour decided to suspend the discharge for one month.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £23 per ton; powder, £24 per ton; extra fine powder, £26 per ton. Packed in 2 cwt. bags carriage paid any station in Great Britain.

ACID, CHROMIC.—1s. 1½d. per lb.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average-National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

AMMONIUM BICHROMATE.—8¼d. par lb.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

CHROMIUM OXIDE.—10d. and 10½d. per lb. according to quantity.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS.—4⅜d. per lb. nett d/d U.K. spot; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8¼d. per ld.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton carr. paid.

SODIUM BICHROMATE CRYSTALS, CAKE AND POWDER.—3⅝d. per lb. nett d/d U.K. spot. Anhydrous ⅜d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3¼d. per. lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar roducts

ACID CARBOLIC CRYSTALS.—7d. to 10d. per lb. Crude 60's, 2s. 5½d. to 2s. 6d. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 7d. per gall. Pure, 5s. 6d. per gall. 97/99.—2s. 1d. to 2s. 2d, per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. 2d. to 2s. 5d. Dark, 1s. 6d. to 2s. 2d. Refined, 2s. 7d. to 2s. 10d. per gall.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 2s. 1d. per gall. Firm. Pure, 1s. 11d. to 2s. 4d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, 6¼d to 6½d. per gall. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 2d. to 2½d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8¼d. to 8½d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, 1s. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb, in ton lots d/d.

p-CRESOL 32/34° C.—2s. per lb., in ton lots d/d.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7¼d. per lb. naked at works. 66/68° C, 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5¼d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£10 to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity, solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £32 per ton; powder, £36 per ton; extra fine powder, £38 per ton. Packed in 2-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 11d. to 1s. 11¾d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 4d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.

BISMUTH CARBONATE.—8s. 9d. per lb.

BISMUTH CITRATE.—8s. 3d. per lb.

BISMUTH SALICYLATE.—8s. 3d. per lb.

BISMUTH SUBNITRATE.—7s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.

BISMUTH OXIDE.—11s. 3d. per lb.

BISMUTH SUBCHLORIDE.—10s. 3d. per lb

BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. o½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.

BORAX B.P.—Crystal, £20 per ton; powder, £21 per ton. Packed in 1- or 2-cwt. bags carriage paid any station in Great Britain.

BROMIDES.—Ammonium, 1s. 11½d. per lb.; potassium, 1s. 8½d. per lb.; granular, 1s. 7¾d. per lb.; sodium, 1s. 10½d. per lb. Prices for 1 cwt. lots.

CALCIUM LACTATE.—B.P., 1s. 2d. to 1s. 3d per lb., in 1-cwt. lots.

CAMPHOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.

FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.

HEXAMINE.—2s. 3d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.

HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 9d. per lb. Green, 2s. 10d. to 3s. per lb. U.S.P., 2s. 7d. to 2s. 10d. per lb.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 9½d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 18s. 6d. per lb. net; Synthetic, 9s. 6d. to 11s. per lb.; Synthetic detached crystals 9s. 6d. to 12s. 6d. per lb., according to quantity; Liquid (95%), 9s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 6d. to 1s. 8d. per lb.

METHYL SULPHONAL.—18s. 6d. to 20s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—3s. 2½d. to 3s. 9d. per lb.

PHENAZONE.—5s. 11d. to 6s. 1½d. per lb.

PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—104s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 6d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—43s. 6d. per lb.

SALOL.—2s. 3d. to 2s. 6d. per lb.

SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.

SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—2s. 2d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 6d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 4d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—9s. 6d. to 10s. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.

THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—12s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—12s. 6d. per lb.

AMYL SALICYLATE.—2s. 9d. per lb.

ANETHOL (M.P. 21/22° C.).—6s. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZYL BENZOATE.—2s. 3d. per lb.

CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.

COUMARIN.—8s. 9d. per lb.

CITRONELLOL.—9s. per lb.

CITRAL.—8s. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—11s. per lb.

GERANIOL (PALMAROSA).—19s. per lb.

GERANIOL.—7s. 6d. to 10s. per lb.

HELIOTROPINE.—6s. 9d. per lb.

ISO EUGENOL.—12s. per lb.

LINALOL.—Ex Bois de Rose, 12s. per lb. Ex Shui Oil, 10s. per lb.

LINALYL ACETATE.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 12s. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—48s. per lb.

SAFROL.—2s. 1d. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—14s. to 15s. per lb. Ex Guaiacol, 12s. 9d. to 14s. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.

ANISE OIL.—4s. per lb.

BERGAMOT OIL.—13s. 9d. per lb.

BOURBON GERANIUM OIL.—18s. 6d. per lb.

CAMPHOR OIL, WHITE.—160s. per lb.

CASSIA OIL, 80/85%.—5s. per lb.

CINNAMON OIL LEAF.—8s. 6d. per oz.

CLOVE OIL (90/92%).—8s. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 13s. 6d. per lb.

LEMON OIL.—11s. per lb.

LEMONGRASS OIL.—4s. per lb.

PALMA ROSA.—11s. 6d. per lb.

PEPPERMINT OIL.—English, 70s. per lb.; Wayne County, 15s. per lb.; Japanese, 5s. 6d. per lb.

PETITGRAIN.—8s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, December 19, 1929.

THERE is a fair amount of activity on behalf of consumers inquiring for their forward requirements, and the volume of business booked is satisfactory. The demand for near delivery is slackening with the approach of the end of the year. Prices continue steady, and in a number of cases, such as alkalies, the prices for new contracts are unchanged. Export business is steady.

General Chemicals

ACETONE.—In steady demand, with the market remaining firm at £76 10s. to £85 per ton, according to quantity.

ACETIC ACID.—A regular trade is passing, with the prices unchanged at £36 10s. for 80% technical and £1 per ton extra for 80% edible.

ACID BORIC.—Fair business is being booked at the recently advanced prices, with the market now steady.

ACID CITRIC.—Only in small request, but price is now steady at 2s. 1½d. per lb., less 5%.

ACID LACTIC.—Rather more business is passing, and the price is maintained at £43 per ton for 50% by weight, pale quality.

ACID OXALIC.—An increased demand is being received, and the market is active at the firm rates of £30 7s. 6d. to £32 per ton, according to quantity.

ACID TARTARIC.—A steady demand is being received, with the price unaltered at 1s. 4½d. to 1s. 4¾d. per lb., less 5%.

ALUMINA SULPHATE is active, with a heavy demand, and prices are firm at £8 to £8 5s. per ton for 17/18%, iron-free quality.

ARSENIC.—A little more business is coming to hand, and there is no change in the price at £16 17s. 6d., free on rail's mines.

BORAX.—Substantial business is being booked at the firm rate of £13 per ton.

CREAM OF TARTAR.—Rather more business is being placed, with the market steady at about £104 per ton for 99/100%, B.P. quality.

COPPER SULPHATE.—Active, with substantial inquiries on the market and price firm at £28 less 5%.

FORMALDEHYDE continues in good request at the unchanged price of £36 per ton.

LEAD ACETATE.—Steady business for white is passing at £44 per ton, with brown at £1 per ton less, and the market is steady at these figures.

LEAD NITRATE.—In fair request at £33 15s. per ton.

LIME ACETATE.—Unaltered in price, with rather more material offering.

LITHOPONE.—Prices are firm at £19 15s. to £23 per ton, according to quantity, with a brisk demand.

POTASSIUM CARBONATE.—Firm at £27 for 96/98% best technical, arsenic-free quality.

CHLORATE OF POTASH.—An increase in the price is reported, with the demand fair. Spot deliveries obtainable at about £30 per ton.

PERMANGANATE OF POTASH is in good demand at 5½d. per ton for B.P. needle crystals, at which figure the market is firm.

SODIUM ACETATE.—In fair request at £22 to £22 10s. per ton, at which rates the market is steady.

SODIUM BICHROMATE.—There is a fair business passing at 3⅝d. per lb.

SODIUM HYPOSULPHITE.—Commercial unaltered in price at £8 10s. to £9 per ton, with a steady call. Photographic crystals in slow demand at about £14 10s. to £15 per ton.

SODIUM NITRITE.—Firm at £20 per ton, with a steady demand.

SODIUM PRUSSIATE.—In good request, with the market unchanged at 4¾d. per lb. to 5¼d. per lb.

SODIUM SULPHIDE.—The market is now steady at the recent advanced rates, and business has been fair.

TARTAR EMETIC.—Unchanged at 11d. per lb.

ZINC SULPHATE.—Firm at £13 10s. with material still inclined to be short for early delivery.

Coal Tar Products

The coal tar products market remains the same, and there is no change to report in prices from last week. No changes are expected until the New Year.

MOTOR BENZOL is unchanged, at about 1s. 5½d. to 1s. 6d. per gallon, f.o.r.

SOLVENT NAPHTHA remains at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA is quoted at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL remains at 3d. to 3½d. per gallon on rails in the North, and at 4d. to 4½d. per gallon in London.

NAPHTHALENES.—The firelighter quality remains at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH.—The market is quiet, and the price remains nominally at 47s. 6d. per ton, f.o.b. East Coast port.

Nitrogen Products

Sulphate of Ammonia.—Buyers in Europe tend to hold off, but a good demand is being experienced from the Far East. The price remains steady at about £8 7s. 6d. per ton f.o.b. U.K. ports in new single bags.

Home.—The prices mentioned in our last report for spring delivery have now been confirmed, and it is understood that on account of the increase for January, there has been some buying for prompt delivery. The larger merchants are also purchasing further forward.

Nitrate of Soda.—The deliveries in consuming markets have been very sluggish, and as production has continued unabated, stocks are heavy in most consuming markets. Arrangements negotiated for a reduction in production will not make an appreciable difference for some months. The price scale is being rigidly adhered to in all markets.

Latest Oil Prices

LONDON, December 18.—LINSEED OIL was steady, but inactive. Spot, ex mill, £45; December £41 7s. 6d.; January-April, £39 15s.; May-August, £37 15s., naked. RAPE OIL was inactive. Crude extracted, £41 10s.; technical refined, £43, naked ex wharf. COTTON OIL was quiet. Egyptian crude, £29; refined common edible, £34; and deodorized, £36, naked ex mill. TURPENTINE was quiet and 3d. per cwt. lower. American spot, 42s. 3d.; and January-April, 43s. 3d.

HULL.—LINSEED OIL.—Spot and December, £43 10s.; January-February, £43 5s.; January-April, £41 7s. 6d.; May-August, £38 15s. per ton, naked. COTTON OIL.—Egyptian crude, spot, £29; December, £28 10s.; edible refined, spot, £32 10s.; tehnical, spot, £32; deodorised, spot, £34 10s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £32 per ton, naked, GROUND NUT OIL.—Crushed/extracted, spot, £35; deodorised; spot, £39 per ton. SOYA OIL.—Extracted and crushed, spot, £31, deodorised, spot, £34 10s. per ton. RAPE OIL.—Crushed/extracted spot, £40 10s.; refined, spot, £42 10s. per ton. TURPENTINE, CASTOR OIL and COD OIL unaltered, net cash terms, ex mill.

Scottish Coal Tar Products

THE holiday feeling is already having an effect on business generally. Markets are becoming quiet, but prices remain fairly steady. It is not anticipated that there will be any violent fluctuation in price of any article in the tar products range for some considerable time, or at any rate until well on in the New Year.

Cresylic acid is a steady market, although inquiries and orders are not so plentiful at the moment. In Scotland supplies are scarce for prompt delivery. Nominal values are easier as follows:—Pale 99/100%, 1s. 11½d. to 2s. 1½d.; Pale 97/99%, 1s. 10d. to 1s. 11d.; Dark 97/99%, 1s. 8½d. to 1s. 9½d.; high boiling, 1s. 11d. to 2s. 1d.; all per gallon at makers' works.

Carbolic sixties.—Value is unchanged at about 2s. 5d. to 2s. 7d. per gallon.

Creosote oil.—Supply is still greater than demand. Prices are weak at 4d. to 4½d. per gallon for specification oil, 3d. to 3½d. per gallon for gas works ordinary, 3⅜d. to 3⅝d. per gallon for washed oil, all free on rails works.

Coal tar pitch.—Scotland is short of supplies, and prices are firm at 52s. 6d. to 55s. per ton for coke oven and horizontal, and 50s. to 52s. 6d. per ton for vertical. Export prices are nominal, at about 5s. per ton less than above.

Refined coal tar is firm at about 3¾d. to 4d. per gallon, ex works, naked.

Crude naphtha continues quiet at 4¾d. to 5¾d. per gallon, filled into buyers' packages at works.

Water white products remain easy as follows:—90/160 solvent, 1s. 1d. to 1s. 2d.; heavy solvent 90/190, 1s. to 1s. 0½d.; benzol, 1s. 5d. to 1s. 5½d.; all per gallon, f.o.r. works in buyers' packages.

South Wales By-Products

WITH the holidays at hand, South Wales by-product activities are very moderate. Patent fuel manufacturers are buying pitch, but only on a small scale. Pitch prices are unchanged at about 48s. to 49s. per ton delivered. Creosote is moving slowly, with values steady at 3d. to 4¼d. per gallon. Solvent naphtha has a small demand at 1s. 2½d. to 1s. 4½d. per gallon, but heavy naphtha is without demand, and values are weak at 11d. to 1s. 1d. per gallon.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, December 18, 1929.

SINCE our last report no material change has taken place in the heavy chemical market. Numerous inquiries are being received, these being mostly for contracts over 1930. Business during the past week has been fairly brisk, but there is still room for improvement. The only change of any importance this week is carbolic ice crystals, which product is very scarce and the price therefore is unsettled.

Industrial Chemicals

ACETONE, B.G.S.—£76 10s. to £85 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply, but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Prompt delivery difficult to obtain and prices quoted for early delivery round about 9½d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. 2d. per lb., less 5%, ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy; dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at about 3½d. per lb., ex store. Offered from the Continent at 3½d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton ex works for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 5d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA, ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton, powdered £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material quoted £37 per ton, ex wharf. On offer for prompt shipment from China at £34 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Now quoted £18 per ton, ex wharf, prompt despatch from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or £4 12s. 6d. per ton f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Remains steady at about £36 10s. per ton, ex works.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—Quoted 4⅜d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton ex store. Offered from the Continent at £25 5s. per ton c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £25 10s. per ton ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA, CAUSTIC.—Powdered 98/99% £17 10s. per ton in drums, £18 15s. per ton in casks. Solid 76/77% £14 10s. per ton in drums, and £14 12s. 6d. per ton for 70/75% in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅜d. per lb. delivered buyers' premises with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or Pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £9 9s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid 60/62% £9 per ton. Broken 60/62% £10 per ton. Crystals 30/32% £7 2s. 6d. per ton delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton; ex store.

ZINC CHLORIDE, 98%.—British material now offered at round about £20 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—Please note that the above prices are for bulk business and are not to be taken as applicable to small parcels.

Power Gas from Sewage

THE system adopted by the Birmingham Tame and Rea District Drainage Board for the generation of power from sludge gas has been very successful, and at a meeting on Friday, December 13, in Birmingham, it was decided to enlarge the plant installation. The Board made its first practical experiment in the utilisation of gas from sludge for power purposes in 1926, and two years later an extension of the equipment was made, the total expenditure at that time being rather more than £30,000. The original estimate was that it would be possible to produce 1½ million units of electricity per annum with a consequent saving of £2,000 per annum, but the experience of the past two years' working showed that it would be possible to obtain an annual output of sewage gas, sufficient to generate 2,000,000 units of electricity with a largely increased saving. The Drainage Board point out that on the completion of the second bio-aeration unit, and on the electrification of sludge pumping operations, the consumption of current will reach three million units per annum. They are therefore installing the third gas engine and alternator. This engine will be of 400 B.H.P., the same size as one installed early this year, and the estimated expenditure on generating sets, switchgear and foundations is £6,250.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, December 19, 1929.

Up to the present the approach of the holidays has had surprisingly little influence upon the trade in chemical products here; at least, business this week has been no worse than at any time during the past month. A satisfactory feature is the active interest being displayed in forward bookings of a number of lines for delivery over the whole or part of next year, with spot deliveries keeping up very well considering the conditions at the consuming end.

Heavy Chemicals

A fair amount of activity has been shown in the case of prussiate of soda, values of which are quite firm at from 4¾d. to 5¼d. per lb., according to quantity. With regard to chlorate of soda, the movement of this material is not particularly good, but offers are steady at about 2⅝d. per lb. Phosphate of soda has shown no alteration in price on balance, offers being at round £11 per ton and a moderate demand being reported on this market. A quiet trade is going through in the case of hyposulphite of soda, with prices steady at about £15 per ton for the photographic material and £9 5s. for the commercial quality. Caustic soda is very firm and meets with a steady call; contract offers range from £12 15s. to £14 per ton, according to quality. Bichromate of soda is also well held at 3⅝d. per lb., less discounts according to the size of contract commitments, and a fairly active inquiry for this material is reported. There has been a fair demand about for sulphide of sodium in respect of forward contracts, with offers of the 60–65 per cent. concentrated solid material at £10 to £14 per ton and of the crystals at £8 2s. 6d. to £9 2s. 6d., according to quantity. Bicarbonate of soda is attracting a fair amount of buying interest, and quotations keep up in the region of £10 10s. per ton. With regard to alkali, values are firm at about £6 per ton, and a moderate demand has been reported this week.

There is not a great deal of business passing in the case of permanganate of potash, although quotations in this section are reasonably steady at round 5¼d. per lb. for the commercial product, and from 5½d. to 5⅝d. per lb. for the B.P. quality. Chlorate of potash keeps up at round 2¾d. per lb., with buying interest in this material on moderate lines. Current offers of carbonate of potash are at about £26 to £26 5s. per ton, and a quietly steady trade has been done on this market during the past week. Firmness continues in evidence in respect of yellow prussiate of potash, values ranging at from 6¾d. to 7¼d. per lb., according to quantity. With regard to caustic potash, this is attracting moderate attention, with offers at from about £31 10s. per ton. Bichromate of potash is firm on a contract basis of 4⅝d. per lb., and a steady demand is being experienced.

Business in sulphate of copper is only on moderate lines, but at up to £27 per ton, f.o.b., values show little sign of reaction, for the present at all events. A quiet trade has been put through in arsenic, offers of which are pretty steady at £16 per ton at the mines for white powdered, Cornish makes. The tendency in the case of the acetates of lime is not too strong, the grey material being currently offered at from £15 10s. to £16 per ton, and the brown at round £7 15s. There has been little change in the position of the lead products, however, though only a quiet business is going through; nitrate is selling at from £33 to £33 10s. per ton, and white and brown acetate at £40 to £39 per ton.

Acids and Tar Products

A fairly steady demand has been reported this week for acetic acid, which keeps firm at about £36 10s. per ton for the 80 per cent. commercial product and £66 for the glacial. Oxalic acid meets with a moderate inquiry and prices are maintained at about £1 13s. per cwt., ex store. Citric acid has shown no further change in values, a quiet business passing at from 2s. to 2s. 0½d. per lb. Tartaric acid seems to be fairly steady at the moment at up to 1s. 4½d. per lb.

Pitch is nominally unchanged on the week at 47s. 6d. per ton, f.o.b., but the demand has not been at all active. With regard to creosote oil, prices continue at about 4¼d. to 4½d. per gallon, naked, with export buying interest on the quiet side. Solvent naphtha is in moderate demand at about 1s. 2½d. per gallon, with carbolic acid, crude and crystals, very firm and in short supply at 2s. 7d. per gallon and 9¾d. per lb.

Company News

American Cyanamid Co.—A quarterly dividend of 40 cents per share on the "A" and "B" common shares is announced, payable on January 2.

Bussey Coal Distillation.—The report for the period June 5, 1928, to June 30, 1929, states that work on company's plant at Glenboig was begun in July last year, and plant was opened in July of this year. First few months' running have shown that, in certain minor details, portions of plant need to be altered. Until these alterations have been made, plant is only capable of partial production.

Low Temperature Carbonisation, Ltd.—In their report for the fifteen months ended October 31 the directors submit a full statement as to the progress and prospects of the undertaking, this statement being in place of the customary account of the company's affairs given at the meeting. For the fifteen months sales and revenue amounted to £115,069, against £64,766 for the preceding twelve months. This figure includes nothing on account of the profit being made at Askern and not more than the results of two or three months' working of the new coal oil distillation plant. A further reduction of £54,267 has been effected in the issued amount of 8 per cent. income debenture stock. The company owns 60 per cent. of the ordinary capital of Doncaster Coalite, Ltd., and the whole of the 8 per cent. debentures and 7½ per cent. preference shares of that company, but no account is taken in the balance sheet of the holding of ordinary shares of the Doncaster company.

New Tamarugal Nitrate Co.—For the year ended July 31, the report shows a gross profit of £142,415. After providing for London and Valparaiso expenses, directors' fees, etc., there remains £123,689 to be carried to balance sheet, and to this is added net balance brought forward of £128,207, making total of £251,896. The local board declared and paid on June 26 last interim dividend of 5 per cent., of which £38,900 representing the portion thereof due to shareholders resident in the United Kingdom, has been paid out of the old reserve fund, while the balance due to shareholders resident outside of the United Kingdom has been paid out of the balance of profits—viz., £11,096; £38,900 transferred to reserve fund, leaving balance of £201,900. After providing for 4 per cent. interest on income bonds for year to July 31, 1929, and amortisation of income bonds (5 per cent. of total issue) the directors propose to transfer £75,000 to new account, called extension and development fund, carrying forward £119,691.

Dead Sea Potash Company

Views on Recent Tests

With respect to the company registered to reclaim mineral salts from the Dead Sea, it is stated that the grant of the concession by the Government is in the final stages and intensive experimental work needed is being carried out on the site. Dr. S. Van Vriesland has made the following statement:—

"The mineral deposits of the Dead Sea are amongst the richest in the world and the only source of potash in commercial quantities in the British Empire. We intend to extract first potash, then bromide, and eventually, when adequate transport facilities are provided, it may be possible to extract common salt as a commercial proposition. At present everything must be transported from and to the Dead Sea by road, and before the work can be fully developed a railway down the Jordan Valley will be needed. The salt water is run into shallow pans and left in the sun to evaporate. This plan will be used when the work is developed, but the pans at present are for experimental purposes only. Dr. Novomeysky, who has formed the company, has been working at the Dead Sea for twenty years, and the recent tests have been extremely satisfactory. The potash will be used largely for fertiliser in Palestine, and the agriculture of the country will undoubtedly be aided considerably when potash is available in quantity."

Mond Nickel Co.

Return of Capital to Preference Shareholders

A REDUCTION of the capital of the Mond Nickel Co., Ltd., from £5,500,000 to £1,500,000, by returning capital to holders of the issued preference shares with certain premiums, was confirmed by Mr. Justice Bennett in the Chancery Division on Monday.

Mr. Cohen (for the company) said that the various classes of share and debenture holders had consented to the reduction. In addition to the return of capital, the preference shares, whether issued or not, were to be cancelled. The company was incorporated in 1914, and the present position was that 99·5 per cent., preference and ordinary, of the capital was held by the International Nickel Co., who were to complete their holding up to 100 per cent. There was to be a reduction of £3,750,000 of nominal capital, and the premiums on the cumulative preference shares involved a further £406,250. There was evidence that the capital was in excess of the requirements of the company. The assets fell into two classes—first, mining rights in Canada, and, second, refining works in the United Kingdom. Both of these had been written up appreciably, and that was amply justified by the fact that the International Nickel Co. had entered into a contract with the Mond Nickel Co. to buy the Canadian assets of the Mond Nickel Co. for £10,548,536. Completion of the sale would take place on December 31 or on the reduction being confirmed. There was a capital reserve account of £6,500,000, so if the reduction were carried out there would be a balance of £2,400,000 to the credit of that account. These figures amply justified the reduction. The whole of the debenture holders were consenting, and all the creditors had been paid off or consented to the reduction.

Mr. Justice Bennett confirmed the reduction.

Another Graesser-Monsanto Acquisition

Brothertons' Wear Tar Works

AN agreement to acquire the Wear Tar Works, Sunderland, from Brotherton and Co., by Graesser-Monsanto Chemical Works, Ltd., is a further stride in the policy of expansion by the latter company, foreshadowed by Mr. J. F. Queeny, chairman of the board, some twelve months ago.

The acquisition of these works, having a distilling capacity of 60,000 tons of tar yearly, will serve to consolidate still further the position of the company as one of the leaders in working up the products derived from carbonisation of coal and distillation of coal tar and will also result in materially adding to the number of products sold by the company, the list of which now aggregates about two hundred. Since 1867, when the works at Ruabon, North Wales, were established, they have progressed continuously and have made a world-wide reputation for chemicals of quality primarily in the phenol and cresol group. In later years, many fine chemicals have been added. Mr. Queeny has spent a lifetime in the chemical industry, and this recent expansion is further evidence of confidence in British development.

Activities of the Electrolytic Zinc Co.

IN the report of the Electrolytic Zinc Co. of Australasia, Ltd., for the year ended June 30 last, just issued, the directors state that the company's interest in the production of synthetic nitrogenous fertilisers in Australia has been merged with investigations being conducted on a large scale by several companies in collaboration. The industry will require a large capital expenditure, and, as exhaustive preliminary investigations are necessary before launching the enterprise, some considerable time will probably elapse before any definite statement on the subject can be issued. The manufacture of lithopone is still under consideration. The company has joined with other interests in the flotation of Synthetic Coal Oil Products Pty., Ltd., to undertake large-scale experimental work in the hydrogenation of Australian and New Zealand coal, primarily for the production of oil. In association with Commonwealth Fertilisers and Chemicals, Ltd., the Electrolytic Zinc Co. is acquiring a block of shares in Imperial Chemical Industries of Australia and New Zealand, Ltd., through which the company will become interested in the manufacture of nitrogenous fertilisers and allied products. In addition, Electrolytic Zinc holds shares in Australian Fertilisers Pty., Ltd., the Imperial Smelting Corporation, Ltd., and Tasmanian Paper Pty., Ltd.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

OIL ALLIANCE, LTD., London, E.C. (M., 21/12/29.) Registered, November 29, £3,118 debentures; general charge. *Nil. December 31, 1928.

Receivership

NEW PROCESS SOAP, LTD. (R., 21/12/29.) H. Kingston, of Adelaide House, King William Street, E.C.4, was appointed receiver and manager on November 14, under powers contained in debentures dated January 29, and April 11, 1929.

London Gazette, &c.

Notice of Intended Dividend

ADCOCK, Robert Gage (trading as ACME SOAP AND CHEMICAL CO.), 41, Oakfield Street, Cardiff, oil and soap merchant. Last day for receiving proofs, January 2. Trustee, E. Owen, 34, Park Place, Cardiff, Official Receiver.

New Companies Registered

DEVELOPMENT OF INDUSTRIES (FILM PROTECTOR), LTD., 92, Victoria Street, London, S.W.1. Registered December 11. Nominal capital, £2,500 in £1 shares. To acquire, exploit and develop inventions and secret processes and in particular a secret process for coating of films and kindred materials, etc. Directors: W. Evans, J. Lever, T. Cooper, C. Griffen.

THE EBANO OIL CO., LTD., 14, Waterloo Place, London, S.W.1. Registered as a "private" company on December 7. Nominal capital £50,000 in £1 shares. Manufacturers of and dealers in asphalt, tar, pitch, and other residual products obtained from coal, oil and other mineral substances, distillers and manipulators of asphalt and other bituminous substances, shipowners, etc.

IPSWICH LABORATORIES, LTD. Registered December 16. Nominal capital, £1,000 in £1 shares. Importers, exporters and manufacturers of and dealers in chemical, industrial and other preparations, etc. A subscriber: T. Briggs, 14, Perth Road, Plaistow, London, E.13.

THE NOR-RUST LIQUID LEAD CO., LTD., 82, Victoria Street, Westminster, London, S.W.1.—Registered on December 16 as a public company. Nominal capital, £26,250 in 25,000 "A" shares of £1 each and 25,000 "B" shares of 1s. each. To adopt an agreement with Swiss Inventions, Ltd., for the acquisition of an invention and process in connection with rust-proof metallic paint, and to carry on the business of manufacturers of rust-proof metallic and other paint and varnish, japanners, dye-makers, builders, decorators, engineers, etc.

TITANIUM AND RARE METALS, LTD., Panton House, 25, Haymarket, London, S.W.1. Registered December 11. Nominal capital, £7,500 in £1 shares. To acquire from W. G. Moore all his existing patents and the benefit of all his patent rights and pending applications throughout the world in relation to the manufacture and use of electrodes of special metals and alloys, and in particular of alloys of titanium and rare and other metals with tungsten for the purpose of rays for therapeutic and other purposes, etc. Directors: Sir Percival R. Reynolds, Col. R. J. Blackham and R. Savage.

Alkalis and Chromates for Estonia

THE approximate demand in Estonia for alkalis and chromates for various technical and industrial purposes is as follows: Caustic soda, 800 to 900 metric tons; potassium bichromate, 30 to 50 tons; soda ash, 1,400 tons. None of these chemicals is made locally, and requirements must be imported.